

Marine Corps Tactical Data Systems



Reference Guide

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INTRODUCTION

The Marine Corps Tactical Data Systems Reference Guide is produced by the Marine Corps Tactical System Support Activity (MCTSSA) Interoperability Office, in support of the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program.

The purpose of this guide is to provide a succinct source of information that describes each tactical data system employed by the United States Marine Corps, the data links each tactical data system employs, and the message standard which supports each data link.

Interoperability of tactical data systems in the support of service, joint, and combined operations is dependent on the individual system's implementation of the message standards supporting each data link. Though all tactical data systems that are certified for joint operations are required to implement a minimum set of messages (MinImp) in addition to their mission essential message sets, few systems implement the full repertoire of messages provided in the Military Standard. The messages that each individual system employs are dependent on its mission and its message implementation is documented in the Interface Design Handbook (IDH) for each service. Each IDH is maintained by the Joint Information and Engineering Organization (JIEO) and is classified Confidential.

The data links described in this reference guide support service, joint, or combined combat operations.

Requests for additional copies of the reference guide, recommendations for the improvement of this guide and updates to information provided are welcomed and should be directed to: Headquarters Interoperability Office, MCTSSA, Box 555171, Marine Corps Base Camp Pendleton, California 92055-5171.



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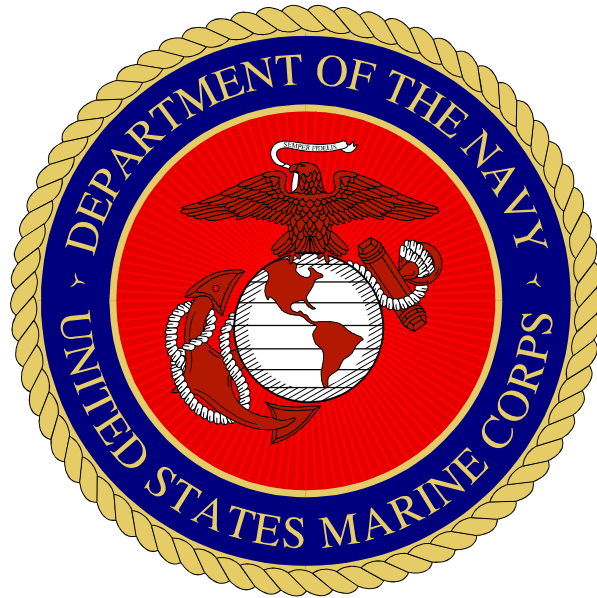
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CHAPTER 1

UNITED STATES MARINE CORPS



ORGANIZATION FOR COMBAT

Marine Air Ground Task Force

The Marine Corps provides expeditionary forces that are organized for combat as Marine Air Ground Task Forces (MAGTF). Each MAGTF is tailored to support its assigned mission and the size of the MAGTF can vary from a Marine Expeditionary Unit (MEU) constructed around an infantry Battalion, to a Marine Expeditionary Force (MEF) constructed around the Marine Division. Regardless of the size of the MAGTF, each is composed of four elements; a Command Element, Ground Combat Element, Aviation Combat Element, and Combat Service Support Element. Centralized command and decentralized control is supported by the infrastructure of each MAGTF element interconnected with senior, adjacent, and subordinate forces through secure tactical radios and local area networks.

Marine Corps forces are continuously forward deployed aboard amphibious shipping of the Amphibious Ready Groups and maintain a forcible entry capability. This capability is augmented by designated Marine Corps forces that rendezvous with Maritime Preposition Shipping to augment the combat capability of Marine forces rapidly in the littorals.

The expeditionary capability of the Marine Corps provides an integrated strike force under a single commander consisting of infantry, armor, artillery, and aviation. These forces are supported by ships of the US fleet and sustained by a sea based logistical capability designed to support extended combat.

The Ground Combat Element provides infantry, artillery, armor, amphibious transport, combat engineers and reconnaissance.

The Aviation Combat Element provides fighter, attack, assault support, and electronic warfare aircraft supported by an organic airborne refueling capability, expeditionary airfields, and an automated air command and control system that includes surface-to-air missiles.

The Combat Service Support Element provides landing support, logistic, engineering, maintenance, medical, dental, and motor transport support.

The Command Element provides planning and operations staff support for amphibious operations, Maritime Preposition Shipping operations, and sustained operations ashore in support of Joint or Combined operations. Reconnaissance elements in support of the MAGTF may be retained at the Command Element or attached to the operating forces.

Though each MAGTF is task organized, each is built around one of the following basic structures.

	MEF	MEB	MEU
CE	MEF HQ	MEB HQ	MEU HQ
GCE	Marine Division	Marine Infantry Regiment	Marine Infantry Battalion
ACE	Marine Air Wing	Marine Air Group	Composite Squadron
CSSE	Force Service Support Group	Brigade Service Support Group	MEU Service Support Group

Marine Division

Parent Command	Components
Division	Division Headquarters Headquarters Battalion Infantry Regiment (3) Artillery Regiment Assault Amphibian Battalion Combat Engineer Battalion Light Armored Reconnaissance Battalion Tank Battalion
Infantry Regiment	Headquarters Company Infantry Battalion (3)
Infantry Battalion	Headquarters & Service Company Rifle Company (3) Weapons Company
Rifle Company	Company Headquarters Rifle Platoon (3) Weapons Platoon
Artillery Regiment	Headquarters Battery Artillery Battalion (3) Counter Battery Radar Platoon
Artillery Battalion	Headquarters Battery Artillery Battery (3)
Assault Amphibian Battalion	Headquarters & Service Company Assault Amphibian Vehicle Company (5)
Combat Engineer Battalion	Headquarters & Service Company Engineer Company (3) Support Company
Communications Battalion *	Headquarters Company Communications Company (3) Service Company
Light Armored Reconnaissance Battalion	Headquarters & Service Company LAV Company (4)
Tank Battalion	Headquarters & Service Company Tank Company (3)
Force Reconnaissance Company*	Force Reconnaissance Platoon (5)

* MEF assets



Marine Aircraft Wing

Parent Command	Components
Marine Aircraft Wing	Marine Wing Headquarters Squadron Marine Aircraft Groups (MAG) Marine Air Control Group (MACG) Marine Wing Support Group (MWSG)
Marine Aircraft Group - Fighter	Marine Aircraft Group Headquarters Marine Fighter Attack Squadrons (VMFA) Marine Refueling Squadron (VMGR) ¹ Marine Aviation Logistics Squadron (MALS)
Marine Aircraft Group - Attack	Marine Aircraft Group Headquarters Marine Attack Squadrons (VMA) Marine Electronic Warfare Squadron (VMAQ) Marine Refueling Squadron (VMGR) ¹ Marine Aviation Logistics Squadron (MALS)
Marine Aircraft Group - Helo	Marine Aircraft Group Headquarters Marine Light Attack Helicopter Squadron (HMLA) Marine Medium Helicopter Squadron (HMM) Marine Heavy Helicopter Squadron (HMH) Marine Aviation Logistics Squadron (MALS)
Marine Air Control Group	Marine Air Control Group Headquarters Marine Tactical Air Command Squadron (MTACS) Marine Air Control Squadron (MACS) Marine Air Support Squadron (MASS) Marine Wing Communications Squadron (MWCS) Low Altitude Air Defense Battalion (LAAD Bn)
Marine Wing Support Group	Marine Wing Support Group Headquarters Marine Wing Support Squadron (MWSS)

Notes: 1. Marine Refueling Squadron (VMGR) may be administratively assigned to either the Fighter or Attack Aircraft Group.

2. MATCALS is assigned to the MACS.



Marine Force Service Support Group

Parent Command	Components
Force Service Support Group	Headquarters & Service Battalion Support Battalion Engineer Support Battalion Maintenance Battalion Supply Battalion Medical Battalion Dental Battalion
Headquarters & Service Battalion	Headquarters Company Service Company Communications Company Military Police Company
Support Battalion	Headquarters & Service Company Support Company Beach & Terminal Operations Company Landing Support Company General Support Motor Transport Company Direct Support Motor Transport Company
Engineer Support Battalion	Headquarters & Service Company Engineer Support Company Bridge Company ₁ Bulk Fuel Company Engineer Company
Maintenance Battalion	Headquarters & Service Company Ordnance Maintenance Company Engineer Maintenance Company Electronic Maintenance Company Motor Transport Maintenance Company General Support Maintenance Company
Supply Battalion	Headquarters & Service Company Supply Company Ammunition Company Medical Logistics Company
Medical Battalion	Headquarters & Service Company Surgical Company (3)
Dental Battalion	Headquarters & Service Company Dental Company
Note 1. 2d FSSG	



Marine Expeditionary Units



CHAPTER 2

***TACTICAL DIGITAL INFORMATION
LINKS***

(TADIL)



Tactical Digital Information Link A (TADIL A)

Purpose	Exchange of EW data, air, surface, and subsurface tracks and points with their amplifying data, in real-time; transmission of orders, alerts and commands.				
Link Characteristics	Simplex Parallel Netted with a single Net Control Station Encrypted (KG-40) Data Rate 1364 or 2250 bps				
Message Standard	MIL-STD-6011B & STANAG 5511 "M" series messages				
Communications Standard	MIL-STD-188-203-1A				
Transmission Format	60 bits per message: <table border="1" data-bbox="475 871 990 951"> <tr> <td>6 EDC Bits</td><td>6 EDC Bits</td></tr> <tr> <td>24 Data Bits</td><td>24 Data Bits</td></tr> </table> <p>6 bits overhead (error detection & correction) and 24 bits of information in each of two frames.</p>	6 EDC Bits	6 EDC Bits	24 Data Bits	24 Data Bits
6 EDC Bits	6 EDC Bits				
24 Data Bits	24 Data Bits				
Wave Forms	Conventional Link 11 Wave Form (Kineplex)(CLEW) Single Tone Link 11 Wave Form (SLEW) Multiple Frequency Link 11 (MFL)				
Users	USMC - TACC, TAOC, TERPES USAF - AOC, CRC/CRE, AWACS, Rivet Joint, Senior Scout, Senior Troupe, RADIC, RAOC/SAOC, U2 DCGS, IADS, PROC USA - Patriot, TMD TOC USN - CV, CG, DDG, FFG, LHA/LHD, LCC, SSN, E2C, EP-3, ES-3, P-3C, S-3				
Communication Medium	HF or UHF				
Data Terminal Sets	AN/USQ-111 (Conventional Link 11 Wave Form) MX512P (Conventional Link 11 Wave Form) AN/USQ-125 (Single Tone Link 11 Wave Form) AN/USQ-120 (Multiple Frequency Link 11)				
Operating Procedures	CJCSM 6120.01B Joint Multi-TADIL Operating Procedures & AdatP-11				
NATO Name	Link 11				

Tactical Digital Information Link B (TADIL B)

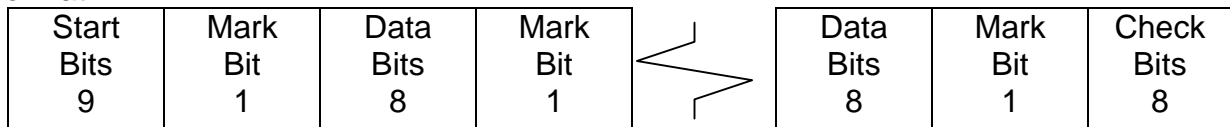
Purpose Exchange of EW data, air, surface, and subsurface tracks and points with their amplifying data, in real time; transmission of orders, commands and alerts.

Link Characteristics Duplex, Serial, Point-to-Point
Encrypted (KG-30, KG-84, KG-94A & KG-194A)
Key Device (KYK-13 & KOI-18)
Data Rate 600, 1200, or 2400 bps

Message Standard MIL-STD-6011B & STANAG 5511
"M" series messages

Communications Standard MIL-STD-188-212

Transmission Format



72 bits per message: 24 bits overhead and 48 bits of information

Users

- USMC - TACC, TAOC, MATCALs, TERPES
- USAF - AOC, CRC/CRE, IADS, RAOC/SAOC, U2 DCGS, IADS, RADIC, ASIT, Senior Troupe
- USA - Patriot, FAADC2I, THAAD, TMD TOC
- USN - None
- NATO - CRC, AN/TSQ-73

Communication Medium Multi-channel radio
Wire

Operating Procedures CJCSM 6120.01B Joint Multi-TADIL Operating Procedures
ADatP 11

NATO Name Link 11B

Tactical Digital Information Link C (TADIL C)

Purpose Aircraft control, aircraft status and target data.

Link Characteristics Simplex, No encryption, Addressed
One or two way link
Data Rate 5000 BPS

Message Standard MIL-STD-6004 (C) STANAG 5504 (NATO C)
"V" and "R" series messages

Communications Standard MIL-STD-188-203-3

Transmission Format

Overhead Bits	Data Bits	Overhead Bits
V=33 / R=17	V=34 / R=37	V=3 / R=2

"V" Message: 70 bits / 34 information

"R" Message: 56 bits / 37 information

Users USMC - TAOC, F/A-18, EA-6B, MATCALS
USN₁ - CV, CG, DDG, LHA/LHD, LCC, E2C, F-14, F/A-18,
EA-6B, ES-3, S-3, C-2
USAF - CRC/CRE, AWACS₂

Communication Medium UHF radio

Data Terminal RT-1379/ASW-25

Operating Procedures CJCSM 6120.01B Joint Multi-TADIL Operating Procedures,
NATOPS F-14D & NATOPS F/A-18, ADatP-4 (NATO C)

NATO Name Link 4 One way link
Link 4A Two way link
Link 4C Two way jam resistant fighter-fighter mode
(ASW-27C)

Operating Modes

1. Precision Course Direction
2. Air Traffic Control
3. Air Intercept Control Link 4A or Link 4C
4. Strike Control
5. Automatic Carrier Landing

Note: 1. USN TADIL C AIC migration to TADIL J by 2005.

2. AWACS TADIL C transmit only.

Tactical Digital Information Link J (TADIL J)

Purpose: Exchange of EW data, points, lines, air, space, surface, subsurface, and land tracks with amplifying data in real-time; navigation and identification. Transmission of orders, alerts, and commands.

Link Characteristics Time Division Multiple Access (TDMA), Spread Spectrum, Frequency hopping; Encrypted (KGV-8)
Data Rate 300 kbps
Keying Devices KYK-13 or AN/CZY-10

Message Standard MIL-STD-6016A (U), STANAG 5516 & STANAG 5616 (NATO U) "J" series messages

Communications Standard Joint Tactical Information Distribution System (JTIDS)
Multifunction Information Distribution System (MIDS)

Message Format

Initial Word - 1 Word

WF	L	SL	MLI	Data	Par
2	5	3	3	57	5

Extension Word - 1 to 4 Words

WF	Data	Par
2	68	5

Continuation Word - 1 to 31 Words

WF	CWL	Data	Par
2	5	63	5

WF-Word Format L-Label SL-Sublabel Par-Parity Check
MLI-Message Length Indicator CWL-Continuation Word Label

Message Packing

STANDARD DOUBLE PULSE

J	S	T	H	Data	P
---	---	---	---	------	---

500 mi

PACKED 2 DOUBLE PULSE

S	T	H	Data	Data	P
---	---	---	------	------	---

300 mi

PACKED 2 SINGLE PULSE

J	S	T	H	Data	Data	P
---	---	---	---	------	------	---

500 mi

PACKED 4 SINGLE PULSE

S	T	H	Data	Data	Data	Data	P
---	---	---	------	------	------	------	---

300 mi

J=Jitter S=Sync T=Time Refinement H=Header D=Data P=Propagation

Tactical Digital Information Link J (TADIL J)

Transmission
Format

Overhead Bits	Data Bits	Parity Bits
2 to 13	57 to 68	5

75 bits per message: 7 to 18 bits overhead 57 to 68 bits of information

Wave Form JTIDS

Current Users: USMC- TAOC, ADCP
 USAF - AOC, CRC/CRE, AWACS, Rivet Joint, JSTARS, ABCCC, F-15C/D, U2 DCGS
 USN - CV, CG, DDG, LHD, LHA, SSN, F-14D, E2C
 USA - Patriot, FAAD C2I, THAAD, TMD TOC, M3P(JTAGS)
 NATO - Tornado, E3D, CRC

Planned Users: USMC- TACC, F/A-18, JSF
 USAF - RAOC/SAOC, ASOC, TACP, ABL, F15E, F-16, OA-10, F22, F-117, JSF, B-1, B-2, B-52, IADS
 USN - F/A-18, LCC, EP3, JSF
 USA - MEADS, AH-66
 NATO - EF2000, Rafale

Communication Medium UHF Joint Tactical Information Distribution System (JTIDS)

Operating Procedures CJCSM 6120.01B Joint Multi-TADIL Operating Procedures & ADatP-16B

US Terminals Class 2 - AN/URC-107 & MIDS Low Volume Terminal

NATO Terminal Multifunctional Information Distribution System (MIDS) Low Volume Terminal (LVT) STANAG-4175

NATO Name Link 16

Army Tactical Data Link - 1 (ATDL-1)

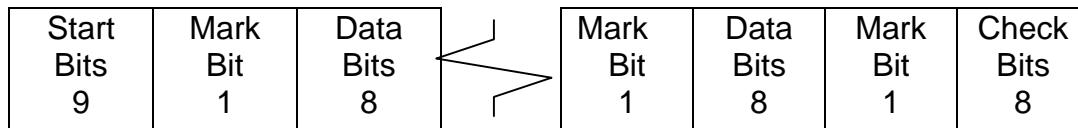
Purpose Exchange of EW data, air tracks and points in real time; transmission of orders, commands and alerts.

Link Characteristics Duplex, Serial
Point to point
Encrypted (KG-30, KG-84, KG-94A, KG-194A) ¹.
Data Rate 600, 1200, 2400 bps

Message Standard MIL-STD-6013A (U)
"B" series messages

Communication Standard MIL-STD-188-212

Transmission Format



72 bits per message: 24 bits overhead and 48 bits of information

81 bits (includes 25 bits of overhead)
56 bits of information

Users

- USMC - TAOC
- USAF - CRC/CRE, IADS
- USA - Patriot, TDM TOC
- USN - None
- NATO - Belgium, Denmark, Germany, Greece, France, Italy, Netherlands, Norway, Turkey
- Allied - Egypt, Israel, Jordan, Korea, Kuwait, Saudi Arabia, Taiwan
- Others - Iran, Iraq ²

Communication Medium Multi-channel radio or Wire

Operating Procedures Chairman Joint Chiefs of Staff Manual (CJCSM) 6120.01B Joint Multi-TADIL Operating Procedures (JMTOP)

NATO Name ATDL-1

Note: 1. Army bulk encryption (KG-94A/KG-194A) is not compatible with Marine Corps and Air Force (KG-30/KG-84) encryption.

2. Iraq captured two Hawk batteries from Kuwait 1990.

North Atlantic Treaty Organization - Link 1 (NATO Link 1)

Purpose Exchange of air tracks and strobes in real time.

Link Simplex or Duplex

Characteristics Point to point
Not normally encrypted
Data Rate 600 or 1200 bps

Message Standard STANAG 5501 (Edition 2) Tactical Data Exchange
Link 1 (Point -to-Point). "S" series messages

Communications Standard STANAG 5601 (Edition 2) Standards for Interface of Data Links 1, 11, 11B, and 14 Through a Buffer

Transmission

Format

Start Bits	Mark Bit	Data Bits	Mark Bit	Data Bits
8	1	7	1	7

Mark Bit	Data Bits	Check Bits
1	7	8

128 bits (Includes 30 bits of overhead)
49 bits per message, paired messages must be sent with maximum 98 information bits.

Users USMC - TACC, TAOC
USAF - CRC/CRE, IADS
USA - None
USN - SSSB
NATO - AEGIS, GEADGE, NADGE, SPADA, STRIDA

Communication Medium Multi-channel radio
Wire

Operating Procedures Allied Data Processing Publication 31 (ADatP-31)

NATO Name Link 1

See page 5-26 for a list of NATO nations.

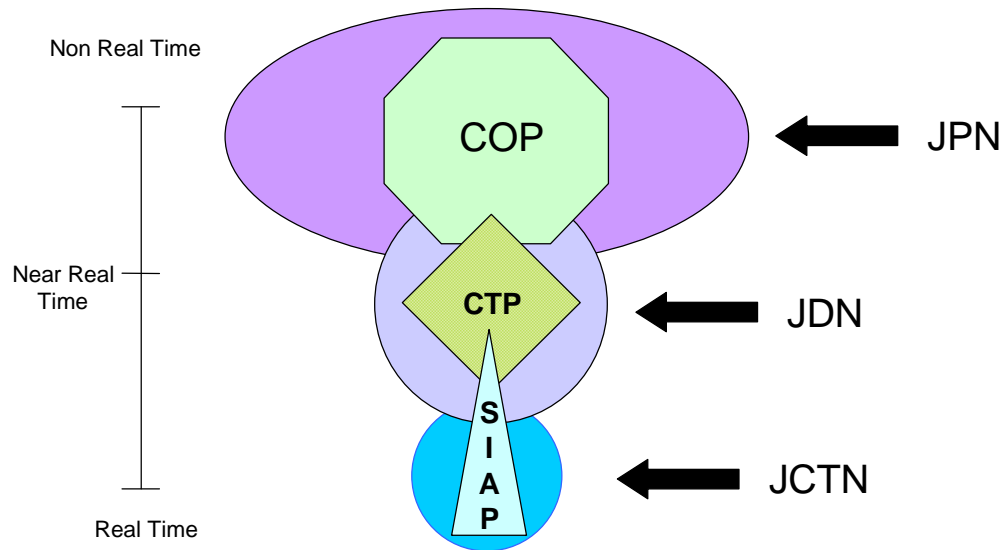
Link 22

Link 22 is a secure, ECM resistant, tactical data communications system that will interface US Navy C2P equipped ships and NATO systems. NATO systems employ a Data Link Processor (DLP) or integrate processing within their host systems to provide real time data exchange over a continuous 300 mile range using NATO Improved Link Eleven (NILE) Communications Equipment (NCE). A link 22 unit may operate up to four networks simultaneously each on a different media with any participant on any network able to communicate with any other participant. Link 22 uses fixed frequency or frequency hopping in the HF and/or UHF bands. Architecture can be TDMA or Dynamic TDMA. The Marine Corps plans to implement Link 22 in the Common Aviation Command and Control System (CAC2S).

Purpose	Exchange of EW data, air, space, land, surface & subsurface tracks and points with amplifying data in real time; transmission of orders, commands and alerts between C2 systems.
Link Characteristics	Time Division Multiple Access (TDMA) or Dynamic TDMA, Spread Spectrum, Frequency Hopping NILE Link Level Crypto Data Rate - Classified
Message Standard	STANAG 5522 3 rd Draft Edition 1 "F" Series and "F/J" Series Messages ₁
Transmission Format	72 bits per message
Wave Form	UHF JTIDS HF Single Tone Link 11
Communications Standard	STANAG 44XX Draft (HF) STANAG 44XX Draft (UHF)
Users	USN - C2P equipped ships NATO - Canada, France, Germany, Italy, Netherlands, United Kingdom, United States
Communication Medium	HF & UHF Simultaneously on different networks
Data Terminal Set	AN/USQ-125 (Single Tone Link 11 Wave Form) AN/URC-107 or MIDS (JTIDS Wave Form)
Operating Procedures	ADatP-22 (NATO C)
NATO Name	Link 22

Note 1. "F/J" Series messages are "J" messages with an additional 2 bits of overhead.

Relationships between COP, CTP & SIAP



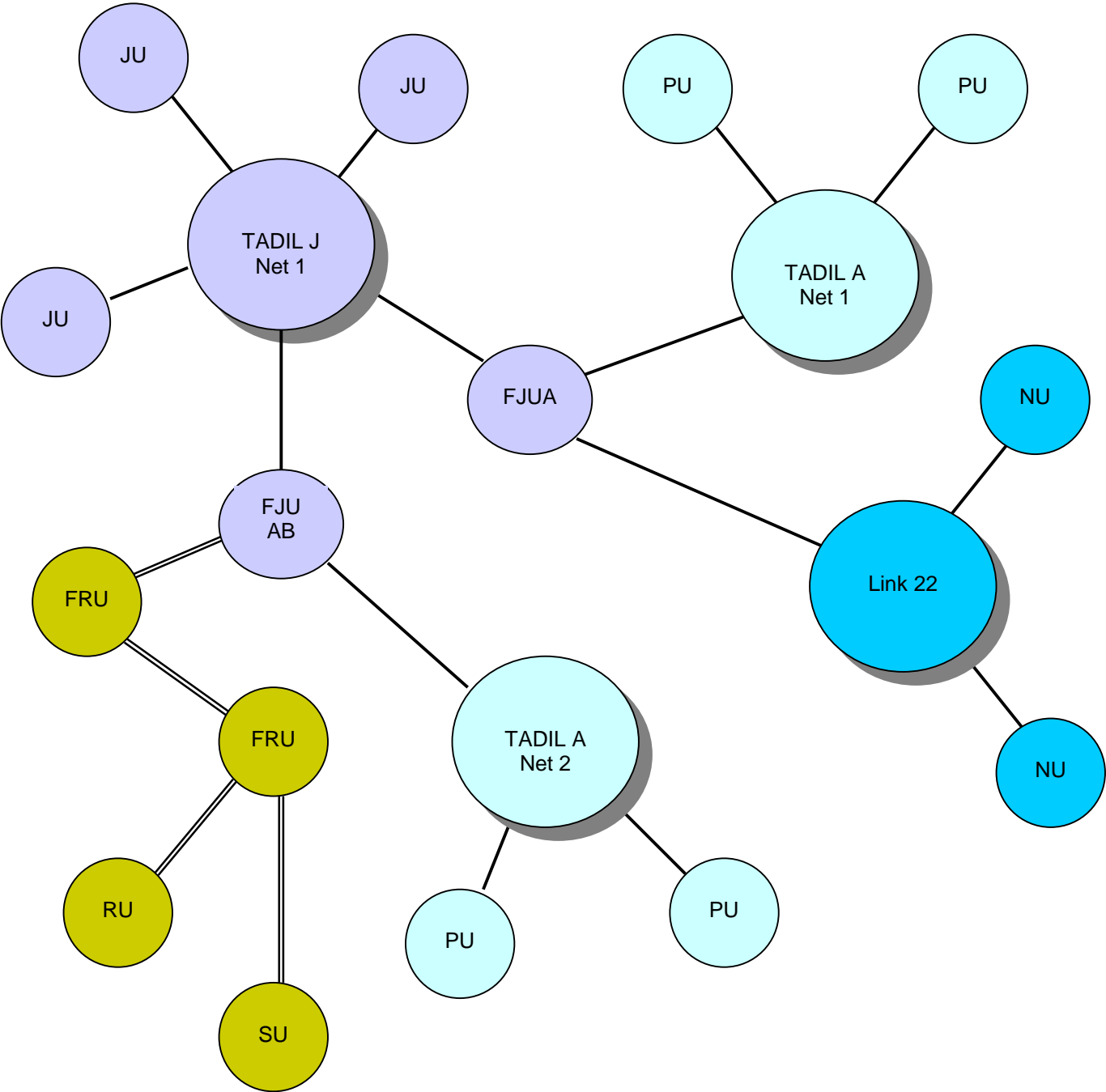
COP	Common Operational Picture
CTP	Common Tactical Picture
SIAP	Single Integrated Air Picture
JPN	Joint Planning Network
JDN	Joint Data Network
JCTN	Joint Composite Tracking Network

Concept. The Common Operational Picture is a composite of the Single Integrated Air Picture derived from the TADIL and Joint Composite Tracking Network, the Common Tactical Picture, derived from the Joint Data Network, consisting of near-real time data from the Integrated Broadcast Service, EPLRS, and Variable Message Format data, and the non-real time data of the Joint Planning Network normally exchanged as USMTF messages. The creation of a common operational picture is dependent on the integration of these diverse message standards and communications links.

Common Operational Picture (COP) - The information exchanged over the Global Command and Control System which depicts the disposition of forces arrayed within a Commander In Chief's Area of Responsibility, with overlays, amplifying information and plans.

Common Tactical Picture (CTP) - A depiction of forces arrayed within a Joint Task Force Commander's Area of Responsibility, with overlays, amplifying information, and plans which support a single operation. Information is derived from service components, national, theater, and tactical sensors, senior, adjacent and subordinate joint and combined commands.

Multi-TADIL Network Architecture



Legend

	Simplex Link	TADIL A, J, or Link 22
	Duplex Link	TADIL B, ATDL-1, or NATO Link 1
FJUA	Forwarding JTIDS Participating Unit	
FPU	Forwarding Participating Unit	
NU	NILE Unit	
PU	Participating Unit	
RU	Reporting Unit	
SU	Supporting Unit	

Notes



CHAPTER 3

DATA LINKS



Cooperative Engagement Capability (CEC)

This data link is used for weapons control and the exchange of unprocessed sensor data among participating platforms. It incorporates some tactical data link characteristics in its communications medium, i.e., Data Distribution System (DDS). The DDS uses UHF wide-band communications with an extremely high data rate that transmits information without regard to fixed format messages. Sensor information developed by the CEC processor, which exchanges data between CEC platforms and their processors via the DDS is provided to the platform tactical data system (TDS). The platform TDS then reports the appropriate information (Track Report) in accordance with the link system protocols via TADIL J, TADIL A, or TADIL B to all link participants. The C4I connectivity for CEC platforms will be TADIL J.

CEC provides a capability for each participant in the net to receive sensor data from a remote source and to engage a threat target using this remote data. One platform can illuminate or track a target and another unit can engage the target. The Marine Corps plans to incorporate CEC in the AN/TPS-59(V)3 radar and the Army is investigating the employment of CEC in support of the Patriot and THAAD missile systems.

Ground Based Data Link

Ground Based Data Link (GBDL) is a Marine Corps unique tactical data link that provides a real time air picture and a command and control capability for Low Altitude Air Defense (LAAD) forces. GBDL is used to link LAAD units such as, Stinger, Avenger, and Light Armored Vehicle-Air Defense (LAV-AD) to each other and to link the Air Defense Communications Platform (ADCP) to LAAD units. LAAD units employ a ruggedized lap top computer (Remote Terminal Unit) that communicates via simplex radio broadcasts using a SINCGARS radio. The SINCGARS radio provides a secure, jam resistant capability for GBDL and allows the air picture to be received and displayed by any user within range of the radio broadcast.

All position locations transmitted on a GBDL net are Cartesian coordinates referenced to a single Data Link Reference Point (DLRP). A Remote Terminal Unit in any configuration may obtain position and time information from a Precision Lightweight GPS Receiver (PLGR) to update and provide own unit location data on GBDL.

The GBDL message standard consists of a small set of fixed length messages that accommodate aircraft, helicopters, jammers, Tactical Ballistic Missiles, and strobes. GBDL is used to distribute the air picture received from the Tactical Defense Alert Radar (TDAR) and TADIL J data received by the ADCP. Commands and pointers, with associated site designations, may be inserted in each of these messages.

Global Command and Control System (GCCS)

The Global Command and Control System (GCCS) consists of message standards, message protocols, and a communications architecture which supports the military planning and execution requirements of the Combatant Commands and the National Command Authority. GCCS mandates a communications architecture that permits rapid, secure, robust information exchange between government echelons supporting military operations to generate a fused theater picture. GCCS supports a wide range of mission applications through a diverse set of application segments executing in a common operating environment. These include:

The Joint Operational Planning and Execution System (JOPES), a combination of joint policies, procedures, personnel, training and reporting structures supported by automated data processing that translates National Command Authority policy decisions into planning guidance and then supports execution of military operations.

The Global Reconnaissance Information System (GRIS) supports planning and scheduling of theater reconnaissance requests, generates reconnaissance messages, and monitors mission execution.

The Evacuation System (EVAC) collects and displays information on US citizens located outside of the US as collected by the US State Department.

The Fuel Resources Analysis System (FRAS) accesses supportability of operations during deliberate and crisis action planning and generates time-phased bulk petroleum requirements to support operations plans.

The Global Status of Resources and Training System (GSORTS) maintains the current status of the personnel, equipment, and training of each military unit.

The Theater Analysis and Replanning Graphical Execution Toolkit (TARGET) supports crisis action planning through access to documentation, analysis, multimedia, and teleconferencing tools.

The Joint Deployable Intelligence Support System (JDISS) provides access to national, theater, and tactical intelligence via the secret internet protocol router network (SIPRNet).

Joint Maritime Command Information System

The Joint Maritime Command Information System (JMCIS) forms the core service for the GCCS during its development as the defense information infrastructure common operating environment (DIICOE) by providing a near-real time, correlated, air, surface, and land track picture of the Area of Responsibility.

Integrated Broadcast Service

The Integrated Broadcast Service (IBS) will replace the current family of UHF satellite broadcast support for general and unique intelligence needs of global, theater and local users. This need is currently filled by TRAP, TIBS, and TRIXS using TDDS, TADIXS-B, TIBS, and TRIXS broadcast systems.

The IBS plan focuses on the integration of several intelligence broadcasts into a system of systems, and the migration of tactical terminals and receivers to a single related Joint Tactical Terminal (JTT) family. The JTT will support up to eight receive channels and each user will determine its requirements. The plan capitalizes the broadcast (one way) and interactive (two-way) functionality in the system of systems. The integrated broadcast system will migrate to a single common data format which will use the Tactical Information Broadcast Service (TIBS) Revision "E" messages as the IBS Over-The-Air message format. The Commanders Tactical Terminal (CTT), Multi-Mission Advanced Tactical Terminal (MATT) and TRE receiver programs have been migrating to a JTT, and that transition will continue with emphasis on preserving features required by a varied user community. The JTT is an interim terminal solution, with further migration planned to Common Integrated Broadcast Service Modules.

The interim planning for the near term will establish an operational coordination circuit between TDDS and TIBS and an enhanced TIBS/TDDS data circuit for the two-way exchange of data. A gateway will be established at the Corps level Integrated Processing Facility (IPF) to permit the exchange of TRIXS and TIBS data. A gateway will be established in the theater region for the injection of TIBS data in TDDS. In the mid-term MTN will be integrated/collocated with TDDS and become an IBS asset.

TDDS, TIBS, TRIXS and TADIXS-B have converted to the TIBS Revision "E" message formats and a gateway will be used to forward IBS message strings to TADIL J and VMF networks (IOC 2003 FOC 2007). IBS will not directly participate on TADIL J or VMF.

For the near future, IBS will employ multiple communications paths with UHF satellite broadcasts used as the medium for high priority messages which support immediate information for targeting, threat warning and threat avoidance and SHF satellite broadcasts used to support routine message exchange.

Marine Corps tactical data systems which will implement or interface with the IBS are the Intelligence Analysis System (IAS), Technical Control Analysis Center (TCAC), Tactical Air Command Center (TACC), Tactical Air Operations Center (TAOC), and the Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES). Included are both parametric and electronic warfare (ELINT) data.

Marine Tactical Command and Control Systems (MTACCS)

Purpose Information exchange between Marine Corps tactical command, control, and intelligence systems through the use of bit oriented formatted messages. This message standard is being phased out and replaced with the Variable Message Format (VMF). ¹

Link Characteristics System dependent

Message Standard MTACCS Technical Interface Design Plan (TIDP), Marine Tactical System (MTS) message.

Communications Standard MTACCS TIDP

Transmission Format

Start Message	Tactical Header Field 1-8	Text Header Field 1-9	End Message
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Former Users USMC - TACC, TAOC, DCT, MATCALs, TCO, IAS, FSCC

Communication Medium System dependent

Note 1. MTS will be superseded by the Variable Message Format (VMF) beginning in 2000. See Variable Message Format (VMF) Technical Interface Design Plan – Test Edition - Reissue 4

MTS Messages See pages 5-22 to 5-24 or a list of MTS messages.

Over-The-Horizon Targeting GOLD (OTG)

OTG, is a US Navy unique communication system used to transmit selected data between Over The Horizon-Targeting (OTH-T) systems and OTH-T support systems. It is the primary message format for Tactical Data Processor (TDP) to TDP information exchange on the Officer in Tactical Command Information Exchange System (OTCIXS) and Tactical Data Information Exchange System (TADIXS).

OTG messages are character oriented and built of an ordered series of sets. Each set is composed of fields that are defined in the Operational Specification for OTG (OS-OTG). OTG messages are built as an ordered series of sets from the appropriate set library. Each message is constructed in accordance with the rules defined in the OS-OTG for the specific message with sets used to compose the message from their supporting tables and entry lists. OTG messages are transmitted on the Secret Internet Protocol Routing Net (SIPRNet) to provide a tactical near real time picture for the Joint Maritime Command Information System (JMCIS).

The Joint Maritime Command Information System (JMCIS) is a Navy initiative to transition from a diverse array of hardware and software which support automated data processing to a simplified common set of hardware and software. JMCIS is compliant with the standards established for the Global Command and Control System (GCCS) and uses segments from GCCS. Real time information provided to the SIPRNet is originated by forces which have a surveillance or intelligence gathering capability deployed world wide.

Marine Corps forces will interface with the GCCS and the JMCIS for both the planning and execution capabilities provided by GCCS and the real-time information exchange of the JMCIS at the Tactical Combat Operations (TCO) interface.



USS Theodore Roosevelt CVN-71

See page 5-25 for a list of OTG messages.

Point to Point Data Link

The Point to Point Data Link (PPDL) is used to transfer data from the AN/TPS-59 radar to the Marine Corps Air Defense Communications Platform (ADCP) AN/TSQ-124. Data is transferred from the radar computer over an RS-232 interface as Tactical Ballistic Missile (TBM) messages to a Digital Voice Telephone/Data Adapter (DVT/DA) where it is provided to a tactical radio for transmission to the ADCP.

The TBM message consists of 58 eight-bit bytes (464 bits) divided into 71 fields. Each message provides information for a single TBM track. Position reports are referenced against the World Geodetic System-84 (WGS-84) model and are reported in latitude and longitude with altitude reported above or below this spheroid in meters. Each message provides the following information:

- TBM identification (track number and TBM type)
- TBM track data (position, velocity, and covariance data)
- Estimated launch or predicted impact point (time and location)
- Drop track flag.

Surveillance and Control Data Link (SCDL)

The Surveillance and Control Data Link is used between the E-8 JSTARS aircraft and tactical ground stations. The JSTARS aircraft distributes its Moving Target Indicator (MTI) and Synthetic Aperture Radar (SAR) data to Army and Marine Corps Common Ground Stations (CGS) AN/TSQ-179 via the SCDL. This data link uses a robust frequency hopping waveform, error correction coding and diversity techniques to mitigate jamming. The network employs a Time Division Multiple Access (TDMA) scheme that can in real time revise network assignments and priorities. The SCDL also provides an “up link” to the E-8 aircraft for radar service requests from the CGS. The Marine Corps employs the SCDL in the Light Common Ground Station variant transported on a HMMWV. The US Navy is testing a capability to receive JSTARS MTI radar data via the SCDL and integrate this data with the GCCS-M track database.



E-8 JSTARS Aircraft

See page 4-20 for a description of the AN/TSQ-179 Common Ground Station.

US Message Text Formats

Purpose	Provide uniform report formats and procedures Facilitate exchange of information, US & Allied Reduce or eliminate dual reporting Produce interoperable man readable and machine processable character oriented message standards
Message Use	Air Operations, Combat Operations, Intelligence, Fire Support Management, and Combat Service Support Management
Message Standard	MIL-STD-6040 & STANAG 5500 / ADatP-3
Communications Standard	Medium independent
Operating Procedures	CJCSM 6120.05
Transmission	System Dependent (JANAP-128, ACP-126, Format ACP-123)
Users	USMC - COC, TACC, TAOC, DASC, FSCC, IAS USAF - AOC, ASOC, ABCCC, WOC USA - TOC, MCS, AFATDS, ASAS USN - GCCS-M, CIC, SACC NATO - OPFACS
Communication Medium	System dependent
NATO Name	FORMETS (See page 5-26 for a list of NATO messages)
Automation Aids	DII COE Message Processor (CMP), IRIS
MTF Messages	See pages 5-13 thru 5-20.

Note: USMTF supports US information exchange requirements and NATO
FORMETS supports Allied information exchange requirements.

Variable Message Format

Purpose	Variable Message Format (VMF) is a bit oriented digital information standard consisting of variable length messages suitable for near real time data exchange in a bandwidth constrained combat environment. The standard contains messages for use in Land Combat, Combat Service Support, Fire Support, Intelligence, Maritime, Air, and Special Operations.	
Message Standard	Variable Message Format (VMF) Technical Interface Design Plan Test Edition - Reissue 4, "K" Series Messages	
Communications Standard	MIL-STD-188-220B, MIL-STD-2045-47001B, MIL-STD-2045-14502 Ch1/6.	
Transmission Format	<u>Header Information</u> Originator Address Group Recipient Address Group Information Address Group Message Handling Group Originator Date/Time/Group Perishability Date/Time/Group Acknowledgment Request Group Response Data Group Version Number Compression Type Message Identification Address Group Reference Message Group Date Time Group Extensions Note: Message length can vary with each use.	<u>User Data</u> Data Field Indicator Data Use Indicator Data Item
Planned	USMC - TCO, AFATDS, IAS, BCS, TCAC, TRSS, DACT, TLDHS, TACC, TAOC, DASC, TERPES, MATCALs, F/A-18, AV-8B, AH-1, UH-1, CV-22, GCCS, MEWSS, TPCS, MIPS, MDSS, MMS, TPQ-36, MCSSC2S, RTU USA - FAADC2I, AFATDS, BCS, MLRS, IFSAS, FED, TPQ-36/37, M1 Tank, M2 APC, AH-64, UH-60, OH-58, AH-66, MBC, MMS, JSTARS CGS USAF - TACP USN - Flag Plot, CIC Other - UK, Australia, Thailand, France	
Communication Medium	Medium independent	
VMF Messages	See pages 5-8 to 5-11 for a list of VMF messages.	



CHAPTER 4

TACTICAL DATA SYSTEMS



Tactical Data System Link Implementation Matrix

Agency	TDS	Weapon System	Data Link
MEF MEB MEU Operations Center	TCO		USMTF, <i>VMF</i>
	IAS		USMTF, IBS, <i>VMF</i>
	TCAC		USMTF, IBS, <i>VMF</i>
	MEWSS		<i>VMF</i>
	TPCS / RREP		<i>VMF</i>
	TRSS		<i>VMF</i>
	EPLRS		EPLRS / PLRS
	JSTARS / CGS		ASAS, SCDL, TACFIRE IBS, <i>VMF</i>
FFCC	AFATDS	Artillery, Mortars	<i>VMF</i> , EPLRS
FSCC	AFATDS	Artillery, Mortars	<i>VMF</i> , EPLRS
FDC	AFATDS	Artillery, Mortars	<i>VMF</i> , EPLRS
FO	DCT, <i>TL DHS</i>	Artillery, Mortars	MTS, <i>VMF</i>
TACC	MSCS	Aircraft, SAM	A, B, J, NATO Link 1, TRIXS, TDDS, TRAP ₁ , TADIXS-B ₁ TIBS, IBS
	CTAPS/TBMCS		USMTF
TAOC	SAAWF	Aircraft, SAM	TIBS, USMTF, IBS
	AN/TYQ-23	Aircraft, SAM	A, B, C, J, ATDL1, Link 1
	AN/TPS-59		PPDL, <i>CEC</i>
ADCP	AN/MSQ-124	Stinger	J, GBDL, PPDL
LAAD	LAV-AD	Stinger, GAU-12	<i>VMF</i>
	Avenger-PMS	Stinger	GBDL, <i>VMF</i>
	Stinger Team	Stinger	GBDL, <i>VMF</i>
DASC	AN/TSQ-207	Aircraft	USMTF, <i>VMF</i>
	KC130/UYQ-3A	Aircraft	None
TACP	DCT, <i>DACT</i>	Aircraft	MTS, TACFIRE, <i>VMF</i>
FAC	DCT, ACASS	Aircraft	MTS, TACFIRE, <i>VMF</i>
FAC(A)	F/A-18D	Aircraft	<i>J</i> , <i>VMF</i>
	AH-1W	Aircraft	<i>VMF</i>
MATCAL S	AN/TSQ-131	Aircraft	B, C, <i>VMF</i>
TERPES	AN/TSQ-90D		A, B, TIBS, IBS, <i>VMF</i>
Aircraft	FA-18C/D	Air-to-Air/Ground	C, CDL, <i>J</i> , <i>VMF</i>
	AV-8B	Air-to-Air/Ground	ATHS-TACFIRE, <i>VMF</i>
	EA-6B	Air-to-Ground	C, MATT/IDM, <i>VMF</i>
	AH-1W	Air-to-Air/Ground	<i>VMF</i>
	UH-1	Air-to-Ground	<i>VMF</i>
	MV-22		<i>VMF</i>

Note: 1. Receive only.

2. Italics denote a planned capability.

Advanced Field Artillery Tactical Data System

The Advanced Field Artillery Tactical Data System (AFATDS) provides an automated capability for fire planning, tactical fire direction, and fire support coordination at the firing battery, Fire Direction Center (FDC), and Fire Support Coordination Center (FSCC).

AFATDS assists the commander in improving tactical planning and control of supporting arms operations. Supporting arms fires that include rocket and tube artillery, mortar, and naval surface fire support are planned and coordinated within the Marine Air Ground Task Force by AFATDS. AFATDS provides an automated capability to integrate supporting arms assets into maneuver plans, provide battlefield information, target analysis, and unit status, while coordinating target damage assessment and sensor operations.

The AFATDS workstation is the main system component of AFATDS and will receive, transmit, edit, display and process fire support requests, and store data to facilitate artillery fire support direction and coordination. A full range of fire support, maneuver control, coordination measures, and geometry are displayed for fire support coordination at the workstation. AFATDS operates within the existing and planned communication architecture (wire and combat net radios), and assist the commander with automated message delivery for coordination of supporting arms fires.

Capabilities:

- Provides for rapid fire planning and scheduling of fires.
- Provides for rapid dissemination of information through digital message transmission.
- Performs target duplication checks in the Artillery Target Intelligence (ATI) mode.
- Can be used as a relay station for remote stations.
- Message Of Interest (MOI) allows for selected information to be received automatically by specified terminals.
- Can be configured as a single or dual terminal operations facility.
- Query or search remote terminals for ATI information.

With internal and external Tactical Communication Interface Modems (TCIM), AFATDS terminals exchange fixed and variable formatted messages. Specifically configured in a centralized mode of operation (FSCC), AFATDS can approve or disapprove all artillery fire in its Zone of Fire by monitoring calls for fire and messages of interest from subordinate operational facilities.

Fielded Equipment	Sun UltraSparc
Operating System	UNIX based
Data communications	VMF

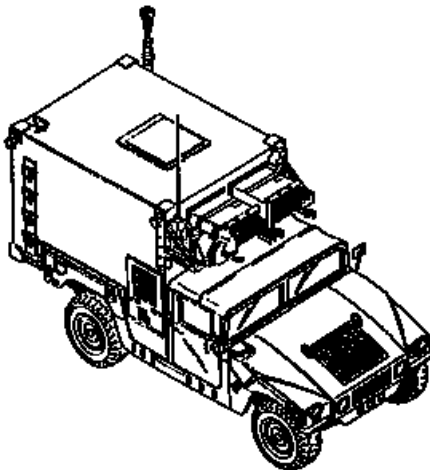
Air Defense Communications Platform

The Air Defense Communications Platform (ADCP) provides early warning and target cueing for the Low Altitude Air Defense (LAAD) battalions. The modified variant of the ADCP will function as the JTIDS communications interface for the TAOC replacing the JTIDS Module and Tactical Data Communications Processor.

The ADCP will function as a communications interface between the Low Altitude Air Defense weapons and the joint surveillance platforms using TADIL J to receive air tracks, orders, commands, and alerts. The ADCP will forward this data to a Short Range Air Defense (SHORAD) unit such as LAV-AD, Avenger, and Stinger teams over the Ground Based Data Link (GBDL).

The ADCP is housed in a Shelterized-Integrated Command Post (SICP) shelter that is transported with the High Mobility Multi-purpose Wheeled Vehicle (HMMWV).

Equipment	AN/MSQ-124
TADIL capability ¹	TADIL J
Data Links	GBDL, IBDL, PPDL
Radios	4 AN/VRC-92 VHF-FM SINCGARS, 2 AN/GRC-231 HF
Encryption	KGV-8, KY-68, KY-99
Terminal type	JTIDS Class 2H AN/URC-107(V)10
Shelters	1 HMMWV mounted SICPS (S-250)
Workstations	2
Computer	2 Sun UltraSparc Single Board VME
Tactical Power	1 MEP-3



Note: 1. TADIL A capability is under consideration.

Air Surveillance and Precision Approach Radar Control System

The Air Surveillance and Precision Approach Radar Control System (ASPARCS) is a Navy funded system under development to replace the Marine Air Traffic Control and Landing System (MATCALS).

MATCALS will be replaced through a phased implementation. In Phase 1, the Air Surveillance Precision Approach Radar Control System (ASPARCS) will replace the command and control, communications, and sensors of the existing Marine Air Traffic Control Detachment. The Common Air Command and Control System (CAC2S) will develop the necessary interfaces that will allow the Air Traffic Control functions of ASPARCS to be compatible and interoperable with the CAC2S. Digital information will be passed from one system to the other. During the second phase of development the communications, command and control, and sensor capabilities of ASPARCS will be transitioned into the CAC2S. The final phase of development is the total assimilation of the ASPARCS functions into the CAC2S.

The Marine Air Traffic Control Detachment (MATCD) provides continuous, day and night, all weather, automated air traffic control service for expeditionary airfields and remote area landing sites.

The MATCD provides Ground Controlled Approach (GCA) during instrument flight rule (IFR) conditions or can provide local tower control during Visual Flight Rule (VFR) conditions.

The MATCD employs an automated system that exchanges air track information via TADIL with other agencies of the Marine Air Command and Control System (MACCS) and the joint interfaced agencies. The MATCD employs a variation of the Navy's Automated Carrier Landing System (ACLS) to control tactical aircraft during GCA via the TADIL C data link.

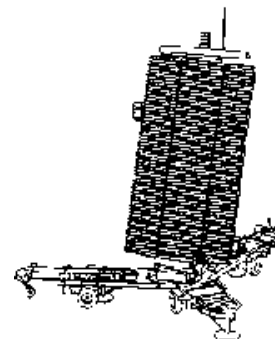
The MATCD employs both surveillance and precision approach radar for aircraft control both during approach and departure from airfields.

Equipment	ASPARCS
TADIL capability	TADIL B and TADIL C
Data links	LAN, WAN, USMTF
Shelters	Lightweight Multipurpose Shelters (HMMWV mounted)
Consoles	Workstations configurable to mission requirements
Parent unit	Marine Air Control Squadron

AN/TPS-59 Long Range Three Dimensional Air Search Radar

The AN/TPS-59(V)3 is a 3-dimensional air search radar, providing long range surveillance, GCI, and IFF capabilities. It is a transportable radar with the antenna carried on three trailers that form the radar base and a data processing/display shelter. The radar supports the Tactical Air Operations Center (TAOC) mission of air and missile defense and provides for air control and airspace management. The radar employs ECCM features that include frequency agility. The radar provides full Theater Ballistic Missile (TBM) detection and tracking capability to an altitude of 1,000,000 feet (189 miles) and provides both missile launch and impact points. Missiles detected by the radar are reported directly to the TAOC or to the Air Defense Communications Platform via a point-to-point data link (PPDL).

The radar antenna is a rotating phased array where the transmitter consists of solid-state D-band transistors where power is generated by direct amplification at the transmission frequencies between 1215 and 1400 MHz. The antenna rotates mechanically in azimuth and a pencil beam electronically scans in elevation from 0° to 19° to cover the specified surveillance volume in a raster scan pattern for air breathing threats (ABT) and up to 60° TBMs.



Surveillance is programmed by selecting a template; typically eight pencil beams are used to scan the long range interval in elevation and 11 are used to cover the short range interval. Provisions are made in the lower long range and short range beams to counter the effects of multi-path propagation and a special low beam height finding technique is used. There is also a special weather mode that automatically optimizes energy management and Moving Target Indicator (MTI) processing according to prevailing weather.

The radar air target detection capability is 500 targets per 10 second scan with a threat criteria of 1 m² scan-to-scan fluctuating targets flying at speeds up to Mach 4. The radar space target detection capability is 50 targets per 5 second scan with a threat criteria of 0.1 m² scan-to-scan fluctuating targets flying at speeds up to Mach 7. A TBM azimuth sector can be designated with the size of the sector ranging from 5° to 360° along with blanking capabilities.

The radar can be operated in three modes; Air, TBM, or Combined mode. TBM detection is performed using three surveillance beams stacked in elevation and scanning in azimuth called a "surveillance fence". As an ascending target passes through the "surveillance fence" it is detected and classified as either an aircraft (Air Breathing Threat) or TBM. TBM detection can only occur in the Combined or TBM mode of operation within the TBM or Combined azimuth sector. Once a TBM target is declared the radar schedules track beams to illuminate the ascending target within a calculated "space gate". The radar optimizes the "space gate" to delete spurious harmonic signal returns.

Avenger

The Avenger is a low altitude air defense missile and gun turret mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). The turret integrates the standard vehicle missile launchers, a 12.7 mm (.50 caliber) machine gun, a Forward Looking Infrared Receiver (FLIR), a Laser Range Finder, an Identification Friend or Foe (IFF) system, and a control and communications system. The Avenger uses an optical sight with an automatic video tracker.

Two SINCGARS radios support data communications via the Ground Based Data Link (GBDL) with other air defense missile systems and sensors. The Remote Terminal Unit (RTU) integrates, correlates, and displays the air picture to the gunner and interfaces with the Avenger fire control computer.

The Avenger standard vehicle missile launcher contains eight Stinger surface to air missiles. The Avenger carries equipment to allow the Stinger missiles to be removed from the vehicle and used as man portable air defense weapons.

The AN/UPS-3 Tactical Defense Alert Radar (TDAR) can be transported by the Avenger and when deployed can provide early warning and queuing information to Low Altitude Air Defense (LAAD) elements. Detection range for helicopters is 5 to 7 miles and for aircraft, approximately 12 miles. Radar data is passed by the Remote Terminal Unit over GBDL.

Avenger land navigation is augmented by a Precision Lightweight Global Positioning System Receiver (PLGR).

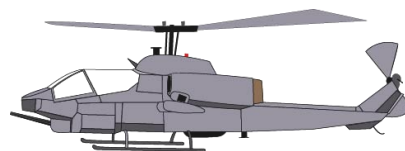


Vehicle	HMMWV
Missile System	AN/FIM-92
Data Links	GBDL
Optical Sights	Automatic Video Tracker
Gun System	12.7 mm (50 Caliber) M3P Machine Gun
Radios	2 AN/VRC-91A VHF-FM SINCGARS
Sensors	Forward Looking Infrared Receiver Laser Range Finder Tactical Defense Alert Radar AN/UPS-3
Navigation	AN/PSN-11 GPS receiver
Parent Unit	Low Altitude Air Defense Battalion (LAAD)

Cobra AH-1W

The AH-1W is a two seat, twin engine, attack helicopter. It performs close air support, escort, anti-armor, armed reconnaissance, and Airborne Forward Air Controller missions. The AH-1W uses a laser targeting system for dual TOW and Hellfire day, night, and adverse weather firing, Forward Looking Infra-Red, laser designation and range finding plus automatic bore sighting. Planned improvements include an embedded Global Positioning System (GPS) and Inertial Navigation System, and a four blade rotor.

Data Link	VMF ₁
Radios	2 AN/ARC-182 UHF/VHF 2 AN/ARC-210 UHF/VHF ₁
Navigation	GPS, TACAN APX 100
Sensor	NTSF-65 FLIR, Laser range finder/designator, TV camera, day/night video tracker, APX-100 IFF
Weapon Capability	AN/BGM-71 TOW AN/AGM-114 Hellfire AIM-9 Sidewinder AGM-122 Sidearm M197 20mm
Ordnance	2.75" Rockets LAU-61 (19 tube) Capability or LAU-68 (7 tube) launcher CBU-55B Fuel Air Explosive (2) M-118 Grenade dispenser (2)



Iroquois UH-1N

The UH-1N is a twin engine utility helicopter which performs command and control, combat assault, medical evacuation, supporting arms control and coordination, fire support and security for forward and rear area forces.

Data Link	VMF ₁
Navigation	GPS, TACAN APX-100
Radios	2 AN/ARC-182 UHF/VHF 2 AN/ARC-210 UHF/VHF ₁ AN/ASC-26 (C2 Com)
Sensors	Forward Looking Infra-Red, Laser range finder
Weapon	M-240 or GAU-17 7.62 mm Machine Gun GAU-16 50 Cal Machine Gun 2.75" Rockets LAU-61(19) or LAU-68 (7 tube) launcher



Marine Corps Light Attack Helicopter Squadrons (HMLA)

HMLA-167	HMLA-169	HMLA-267	HMLA-269
HMLA-367	HMLA-369	HMLA-773	HMLA-775
HMT-303			

Notes: 1. AN/ARC-210 radio with DCS RT-1794(C) UH-1N in 2002, AH-1W in 2003.

Common Aviation Command and Control System

The Common Aviation Command and Control System (CAC2S) is envisioned as the replacement C2 equipment for each agency of the Marine Air Command and Control System; the TACC, TAOC, DASC, MATCD and LAAD COC. The concept envisions employing common shelters, hardware, and software modules in a “Lego like” fashion with a single software core supporting all elements of the MACCS, and unique hardware and software modules tailored to the mission needs of each MACCS agency.

Functions common to all MACCS agencies, including requirements for aviation command and control planning, will make up the core software of CAC2S. Mission unique functions will be configurable and selectable from every workstation depending on the required capabilities of a specific node. Each node will consist of four subsystems; Processing and Display, Communications, Sensor / Data, and Infrastructure, i.e., shelters, vehicles, mobile power and environmental control units.

Each MACCS agency will consist of a CAC2S node composed of operational cells. Cells will be composed of CAC2S modules. Modules will be man portable. Analogous to the MAGTF, each MACCS agency will have the flexibility to add modules or cells to each individual node to meet mission requirements. This provides a capability to rapidly insert a node and expand its capability to meet changing requirements. It also allows redundant capabilities to be inserted to meet existing or anticipated threats.

CAC2S modules may be operated from encampments, HMMWV mounted shelters, ship or airborne platforms, bunkers, or structures.

The planned data exchange capability of the CAC2S is TADIL A, B, C, J, ATDL-1, NATO Link 1, Link 22, GBDL, PPD, USMTF, IBS, CEC, and VMF. The CAC2S will provide both a Local Area Network and Wide Area Network capability in addition to internal and external voice communications.

Equipment	CAC2S
TADIL capability	A, B, C ₁ , J, ATDL-1, NATO Link 1, Link 22
Data Links	USMTF, VMF ₂ , GBDL, PPD, CEC, IBS ₃
Shelters	Lightweight Multipurpose Shelters (HMMWV mounted)
Consoles	Workstations configurable to mission requirements
Parent unit	Marine Tactical Air Command Squadron, Marine Air Control Squadron, Marine Air Support Squadron

- Notes:
1. USN TADIL C AIC migration to TADIL J completed by 2005.
 2. VMF is planned.
 3. Integrated Broadcast Service will replace TIBS/TRAP

Complimentary Low Altitude Weapons System

The Complimentary Low Altitude Weapons System (CLAWS) is a developmental system proposed to compliment the current Low Altitude Air Defense (LAAD) battalion Stinger missile capability. CLAWS uses the current Avenger HMMWV adapted to transport and launch five AN/AIM-120 Advanced Medium Range Air-to-Air Missiles (AMRAAM). CLAWS will provide mobile, medium range, low altitude, all-weather, surface to air missile fires to engage aircraft, Unmanned Aerial Vehicles (UAV) and Cruise Missiles.

Command and control will be provided through the existing Marine Air Command and Control System. The TAOC will develop a Single Integrated Air Picture within it's sector of responsibility by fusing intelligence reports with sensor reports from the AN/TPS-59, AN/TPS-63, AN/UPS-3 Tactical Defense Alert Radar (TDAR), and the AN/MPQ-62 Continuos Wave Acquisition Radar (CWAR) and remote reports derived from data links: CEC and TADIL. Target cueing will be provided through the Remote Terminal Unit (RTU) via the existing Ground Based Data Link (GBDL).

LAAD sections perform the following functions:

- Provide close-in, low altitude, surface-to-air weapons fires in defense of forward combat operations centers, vital areas, and installations.
- Provide surface-to-air weapons support for units engaged in special or independent operations.

Current surface-to-air fires consist of the 25mm GAU-12/U multi-barrel cannon and Stinger (AN/FIM-92) missiles. Future surface to air fires will include the AMRAAM AN/AIM-120 transported aboard and launched from the HMMWV. Battery Control Centers are envisioned as a variation of the current Air Defense Communications Platform (ADCP).

Equipment	Avenger HMMWV (Modified) Remote Terminal Unit
Data Links	GBDL
Sensors	AN/UPS-3 TDAR, AN/MPQ-62 CWAR
Missile Range	20 miles plus
Missile Guidance	Active radar terminal/inertial midcourse
Missile Launch Weight	335 pounds
Parent unit	Low Altitude Air Defense Battalion, Marine Air Control Group
IOC	Milestone I/II decision by early FY-2002.

Note: The Norwegian Air Force has fielded a ground launch version of AMRAAM.

Contingency Theater Air Planning System

The Contingency Theater Air Planning System (CTAPS)₁ is used by each of the services to allocate aircraft sorties, plan aircraft missions, and then disseminate flight schedules in the Air Tasking Order (ATO) Message.

Aircraft mission planning is performed at two levels. In the Squadron and Group the Tactical Aircraft Mission Planning System (TAMPS) is used as the automated tool for mission planning. At the Tactical Air Command Center (TACC) CTAPS supports the planning function of the Future Operations Section and the Current Operations Section with ATO management functions.

CTAPS uses Unix workstations interconnected via a local area network to disseminate planning information internally and provides for the generation of the ATO message in the USMTF format for distribution over wide area networks or tactical radio.

CTAPS applications include:

- Autodin Communications
- System Administration
- Electronic Mail
- Computer Assisted Force Management System (CAFMS)
- Joint Message Analysis and Processing (JMAP)
- Joint Message Processing and Parsing (JMPP)
- Rapid Applications of Air Power (RAAP)
- Air Planning System (APS)
- Airspace Deconfliction System (ADS)
- Common Mapping System (CMS)
- Intelligence Correlation Module (ICM)
- Combat Intelligence System (CIS)
- Force Level Execution (Theater Battle Management Core System) (TBMCS)

Shelters consist of a combination of 3:1 expandable ISO and Modular Extendable Ridged Walled Shelters (MERWS).

CTAPS in conjunction with the Multiple Source Correlation System (MSCS) are the equipment suites that support the Tactical Air Command Center (TACC).

Equipment: AN/TYY-1

Message Standard: USMTF

Note 1. Theater Battle Management Core System (TBMCS) is planned to replace CTAPS in FY 2000.

Data Automated Communications Terminal

The Data Automated Communications Terminal (DACT) is a man portable tactical data entry device. The DACT will receive, store, display, modify, and transmit digital maps, overlays, messages and reports, and position information via tactical radios, networks, or wire lines. The DACT uses an embedded Global Positioning System (GPS) receiver to display its own location on digital maps and to automatically transmit this data to other units.

The DACT will support command and control, maneuver, fire support, intelligence, air operations, and combat service support VMF messages. Information managed by the DACT includes other unit's positions, coordinates of user designated points, pre-formatted messages, and free text information. The DACT will provide a digital communications capability below the Battalion level to Company and Platoon commanders, Forward Observers, Reconnaissance team leaders, Scout-Sniper teams, Forward Air Controllers, and Patrol Leaders. Planned fielding of the DACT is scheduled for 2001. Specifications listed are for the prototype equipment.

Equipment	DACT (TACTER-21)
Data Links	VMF
Communications	AN/PRC-119A SINCGARS radio
Navigation	Embedded GPS PPS C/A or P/Y Codes
Encryption keying	TSEC/KYK-13 or AN/CZY-10
Software	Command & Control Personal Computer (C2PC) MS DOS/ Win9x
CPU Type	IBM-PC/AT compatible, MMX ready Pentium
Power	BA-5600/U or Vehicle 28 VDC @ 2.2 watt
Protocol	MILSTD-188-220A



Direct Air Support Center

The Direct Air Support Center (DASC) is the senior air support agency within its assigned sector. The DASC processes immediate direct air support requests, coordinates the employment of aircraft with other supporting arms to include tube and rocket artillery and naval surface fire support, and provides procedural control of aircraft within the assigned control area.

The DASC coordinates the execution of preplanned and immediate direct air support in response to the ground combat situation. The DASC assigns support aircraft to terminal control agencies; Forward Air Controller (FAC), Airborne Forward Air Controller (FAC-A) and Helicopter Support Team (HST).

The DASC can be employed in two configurations. The DASC in its ground configuration employs the AN/TSQ-207, a suite of 5 HMMWV mounted shelters booted to a Deployable Rapid Assembly Shelter (DRASH). Data communications will include VMF and USMTF message formats. The DASC has an automated capability to receive and parse the Air Tasking Order (ATO) as a USMTF document. When employed in its airborne configuration the DASC consists of a single S280 shelter, the AN/UYQ-3A, operated aboard a Marine Corps KC-130 aircraft.



Current equipment	Ground DASC AN/TSQ-207
Shelters	5 HMMWV mounted LMS shelters booted to a Deployable Rapid Assembly Shelter (DRASH)
Consoles	12 Sun Sparc-5 Laptop + 3 Sun Sparc-20 servers
Data Links	PLRS/EPLRS, USMTF, VMF (2001)
Radios	4 AN/VRC-102 HF, 3 AN/VRC-83 VHF-AM 6 AN/GRC-171B(V)4 UHF-AM/FM, 2 AN/VRC-90A VHF-FM, and can remote 9 additional radios (OE-167)
Current equipment	Airborne DASC AN/UYQ-3A
Data Links	None
Shelters	1 S280 6'11"x7'3"x12'2"
Radios	2 AN/GRC-193 HF, 3 AN/GRC-171A(V)2 UHF, 1 AN/VRC-90 VHF, can remote 6 additional radios 1.
Planned equipment	RAMDASC (Airborne DASC) see page 4-38
Parent unit	Marine Air Support Squadron

Note 1. Communications capabilities are augmented with MRC vehicles.

Enhanced Position Location Reporting System

The Enhanced Position Location Reporting System (EPLRS) consists of a Net Control Station and up to 460 EPLRS Radio Sets. EPLRS provides geodetic position location information and a dedicated data communications network to units below the regimental level. Data throughput ranges from 3.5 to 56 kbps for a variety of broadcast and point-to-point data modes.

The EPLRS Radio Set is normally vehicle mounted but may be removed and used in a man pack configuration. EPLRS operates on eight channels in the UHF spectrum (420-450 MHz) and is a computer based, time-ordered spread spectrum radio system that uses time division multiple access technology to provide a secure, robust communications architecture. This architecture supports the automated data distribution to adjacent, senior, and subordinate commands and simultaneously provides unit position reports to automated C2 centers to update near real-time tactical displays, independent of GPS.

The NCS equipment is housed in a HMMWV mounted S-786 shelter and provides the EPLRS control network, routes control net messages and queries, performs all calculations, and graphically displays the positions of all active PLRS Basic User Units and EPLRS Radio Sets. The NCS provides Over The Air Rekeying (OTAR) to Radio Sets that require keys for Command, Traffic, Rekey, or Community of Interest (COI).

The NCS sets up and monitors communication need lines that host communications between the NCS and other computer systems, and is the central processing facility that provides position location, identification, and navigation information for both PLRS and EPLRS. The primary and alternate PLRS Master Stations are replaced with two EPLRS Net Control Stations.

EPLRS primary purpose is to provide the digital backbone radio frequency communications to support connectivity of the C4I tactical data networks from regimental to company level.

PLRS Master Station	AN/TSQ-129A USMC, USA AN/KSQ-1 USN, USA
EPLRS NCS	AN/TSQ-158(V)4 USMC, USA
Encryption	KOK-13
PLRS BUU	AN/PSQ-4
EPLRS Radio Set	AN/VSQ-2C(V)1 SADL USAF F-16, A-10
LOS Relay	AN/MRC-145
Parent Unit	Division Communications Company, Marine Division



Harrier AV-8B

The AV-8B Harrier is a single seat attack aircraft which has both a Vertical Take Off and Landing (VTOL) and Short Take Off and Landing (STOL) capability. The AV-8B incorporates a Laser Rate Bombing System including TV and Laser Spot Tracking, Forward Looking Infra-Red and the AN/APG-65 radar to provide both a day and night attack capability. The Forward Air Controller uses the Advanced Close Air Support System (ACASS) to exchange near real time information with the AV-8B using TACFIRE messages. Upgrades include GPS, the AN/ARN-153 TACAN, and the Automatic Target Hand-off System (ATHS) II to exchange target, stores management, and mission essential information over a digital communications network that employs burst transmission for data exchange with the Variable Message Format (VMF) message standard. The AV-8B has a primary mission of providing close air support of ground forces with an additional capability to conduct deep air support and air defense missions as required. Digital communications integration plan:

Time Frame	Platform	Communications	Tactical Data System	Message Standard
Current	AV-8B	ARC-182	ATHS	TACFIRE
	FAC	PRC-113, PRC-119	DCT / ACASS	TACFIRE
2001	AV-8B	ARC-182	ATHS II	TACFIRE
	FAC	PRC-113, PRC-119	DACT / ACASS	VMF
2003	AV-8B	ARC-210/RT-1556A ₁	ATHS II	VMF ₂
	FAC	PRC-140, PRC-119	TLDHS	VMF

Sensor systems	AN/APG-65 radar AN/AAR-50 Forward Looking Infra-Red (FLIR) Angle Rate Bombing System (TV/Laser Spot Tracking)		
Radios	2 AN/ARC-182 UHF/VHF 2 AN/ARC-210 ₁ UHF/VHF, SINCGARS, Havequick 2		
Terminal Data Links	ATHS II (Improved CP-1516 ASQ-ATHS) MTS, AFAPD, TACFIRE ECP 05, VMF ₃		
Weapon Capability	AN/AIM-9 Sidewinder AN/AGM-65 Maverick AN/AIM-120 AMRAAM GAU-12 25mm cannon		
Ordnance Capability	Mk 80 Series General purpose bombs GBU-10 & GBU-12 laser guided bombs CBU-59 Cluster bombs		
Marine Corps Attack Squadrons:	VMA-211 VMA-231 VMA-542	VMA-214 VMA-311 VMAT-203	VMA-223 VMA-513



Notes: 1. AN/ARC-210 radio with DCS RT-1556A FOC-2003
 2. AN/ARC-210 1556A not compatible with VMF protocol.
 3. Planned; DOD C4I Tactical Data Link Management Plan

Hercules KC-130

The KC-130 Hercules is a four engine turboprop transport aircraft that provides a drogue aerial refueling service to aircraft and helicopters, and assault transport for personnel, equipment, and supplies. The KC-130 can operate from short, unimproved airfields, or can provide aerial delivery of personnel and supplies by parachute. The KC-130F and R can be configured to contain an Airborne Direct Air Support Center (DASC), but lack SINCGARS antennas. The KC130J has no DASC capability. The KC-130 can provide sustained area illumination by dropping parachute flares.

Planned upgrades are the transition to the AN/ARC-190 radios for HF communications and the AN/ARC-210 radio for VHF/UHF AM/FM communications to include demand assigned multiple access (DAMA) satellite communications.

Squadrons are VMGR-152 (Futenma), VMGR-252 and VMGRT-253 (Cherry Point), VMGR-353 (Miramar) and Reserve Squadrons VMGR-234 & VMGR-452 operating the KC-130T.

KC-130 Variations

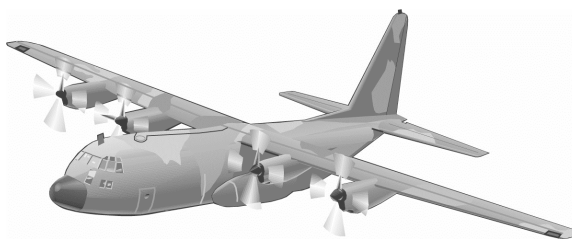
Capability	KC-130F	KC-130J	KC-130R	KC-130T
HF radio	ARC-102/190	ARC-190(V)8	ARC-94	ARC-190(V)3 ₁
VHF radio	ARC-186	ARC-222	ARC-186	ARC-186
UHF radio	ARC-159	ARC-164	ARC-159	ARC-159
VHF/UHF	ARC-210 ₂	ARC-210 ₃	ARC-210 ₂	ARC-210 ₂
SATCOM	ARC-210/1794	ARC-210/1794	ARC-210/1794	ARC-210/1794
TACAN	ARN-118	ARN-153(V)4 ARN-139	ARN-118	ARN-118 ARN-139

TADIL capability KC-130J TADIL J capability is under consideration.

Data Link KC-130J VMF capability is under consideration.

Radios

- AN/ARC-94 HF
- AN/ARC-159 UHF/AM
- AN/ARC-164 UHF AM
- AN/ARC-186 VHF AM/FM
- AN/ARC-190 HF AM/SSB
- AN/ARC-210 UHF/VHF
- AN/ARC-222 VHF AM/FM



Navigation TACAN, GPS

Defensive systems

- Missile Warning System AN/AAR-47
- IR Countermeasures AN/ALQ-157
- Chaff/Flare Dispenser AN/ALE-47
- Radar Warning Receiver AN/ALR-56M or 69

Ordnance Chaff and Flares

- Notes:
1. IOC for AN/ARC-190(V)3 radio FY2002
 2. 1 ARC-210 w/RT-1556 & 1 ARC-210 w/RT-1794(C)
 3. 1 ARC-222 (VHF) & 1 ARC-210 w/RT-1794(C)

Hornet F/A-18

The F/A-18C is a multi-mission single seat tactical aircraft that operates in all weather conditions to intercept enemy aircraft and attack ground targets. The F/A-18D is a two seat multi-mission tactical aircraft that operates day or night, under all weather conditions to conduct multi-sensor imagery reconnaissance, supporting arms coordination, attack of ground targets, and interception of enemy aircraft. The F/A-18 exchanges real time information with the Marine Tactical Air Operations Center (TAOC) via one or two-way TADIL C. Planned upgrades for the F/A-18 include GPS, VMF, TADIL J, the APG-73 radar and APX-111 IFF system. The F/A-18 will be a Non-Command and Control JTIDS Unit (Non-C2JU) which will employ the Multi-functional Information Distribution System (MIDS) Low Volume Terminal. The F/A-18 will support both the air defense and air support missions through implementation of VMF and TADIL J and participate in surveillance, weapon coordination and mission management, control, voice and "fighter to fighter" data exchange. VMF message exchange will be supported with the ARC-210 UHF/VHF radio incorporating the DCS RT-1794(C).

The F/A-18 will retain a TADIL C capability after the incorporation of TADIL J to support the automated landing capability afforded by the Marine Air Traffic Control and Landing System (MATCALS) and the Navy shipboard Automated Carrier Landing System (ACLS) until ACLS transitions to TADIL J.

TADIL capability TADIL C (RT-1379/ASW-25), TADIL J (MIDS LVT)₁

Data Link Common Data Link ₂, VMF₃

Radios AN/ARC-182 UHF/VHF (2 per F/A-18A)
AN/ARC-210/1556 UHF/VHF₄ (2 per F/A-18C/D)

Sensor systems AN/APG-65 radar
AN/AAS-38B Forward Looking Infra-Red (FLIR)
AN/AAR-50 Thermal Imaging Navigation System (TINS)
AN/AVQ-28 Heads Up Display (HUD)
AN/APX-100 (IFF)
Advanced Tactical Air Reconnaissance System (ATARS) ₂

Weapon Capability	AN/AIM-7 Sparrow	AN/AIM-9 Sidewinder
	AN/AIM-120 AMRAAM	AN/AGM-65 Maverick
	AN/AGM-84 Harpoon	AN/AGM-88 HARM
	AN/AGM-154A JSOW	M-61 20mm Cannon

Ordnance Mk 80 Series General purpose bombs
Capability GBU-10 & GBU-12 laser guided bombs
CBU-59 Cluster bombs

Notes: 1. TADIL J implementation 2003.

2. Advanced Tactical Air Reconnaissance System uses the Common Data Link.

3. VMF implementation, FA-18A in 2000, FA-18C/D in 2001.

4. 1 ARC-210 w/DCS RT-1794 FY 2000

Marine Corps aircraft types, squadron locations, and capabilities.

Squadron	Aircraft	Location	Capability
VMFA-101	F/A-18 A/B/C/D	Miramar, CA	Training sqdn.
VMFA-112 Res	F/A-18 A/B	Fort Worth TX	
VMFA-115	F/A-18 A	Beaufort, SC	MIDS
VMFA-121 (AW)	F/A-18 D	Miramar, CA	N, <i>MIDS</i>
VMFA-122	F/A-18 A	Beaufort, SC	
VMFA-134 Res	F/A-18 A	Miramar, CA	
VMFA-142 Res	F/A-18 A	Atlanta GA	
VMFA-212	F/A-18 C	Beaufort, SC	
VMFA-224 (AW)	F/A-18 D	Beaufort, SC	N, <i>MIDS</i>
VMFA-225 (AW)	F/A-18 D	Miramar, CA	N, <i>MIDS</i>
VMFA-232	F/A-18 C	Miramar, CA	
VMFA-242 (AW)	F/A-18 D	Miramar, CA	N, <i>MIDS</i>
VMFA-251	F/A-18 C	Beaufort, SC	N, <i>MIDS</i>
VMFA-312	F/A-18 C	Beaufort, SC	N, <i>MIDS</i>
VMFA-314	F/A-18 C	Miramar, CA	N
VMFA-321 Res	F/A-18 A/B	Washington DC	
VMFA-323	F/A-18 C	Miramar, CA	N, <i>MIDS</i>
VMFA-332 (AW)	F/A-18 D	Beaufort, SC	N, <i>MIDS</i>
VMFA-533 (AW)	F/A-18 D	Beaufort, SC	N, <i>MIDS</i>

Table Codes

AW	All Weather	N	Night capable
GPS	Global Positioning System	Res	Reserve Squadron
MIDS	Multi-Functional Information Distribution System	Italics	Planned Capability



Intelligence Analysis System

The Intelligence Analysis System (IAS) is a mobile, shelterized, all-source intelligence fusion center that automates the MAGTF intelligence activities of direction, collection, processing, production, and dissemination of multi-source critical tactical intelligence. The IAS is designed to operate as a Top Secret / Special Compartmented Information (SCI) facility.

The IAS can be deployed as a single work station (IOW) to support a battalion, squadron, or Surveillance Reconnaissance Intelligence Group (SRIG). Deployed as an intermediate configuration to support a Marine Expeditionary Unit (MEU), division, wing, Force Service Support Group (FSSG) or regiment, or deployed as the Marine Expeditionary Force (MEF) configuration to support MEF or MEU command elements. The MEF IAS configuration consists of two separate shelters, each mounted on a HMMWV. Eight additional workstations are supported via a Local Area Network.

Information received by the IAS is automatically processed and archived in a journal workbook, and sorted and distributed to various databases. These databases support the situation map and provide access through operator workstations to plan for intelligence collection, and process and display information to the operator. Administrative support is provided through word processing, graphics, and database management system programs.

Information is received by the IAS that displays all-source data to the "decision makers". This data is disseminated over tactical HF, VHF, and UHF communications to include satellite. Information sources are USMTF character messages, the Joint Service Imagery Processing System (JSIPS), the Joint World Wide Intelligence Communications System (JWICS), the Joint Deployable Intelligence Support System (JDISS) and voice.

The IAS mapping program uses Defense Mapping Agency (DMA) data to display three-dimensional images, including terrain, which can be overlaid with tactical data such as unit positions, boundaries, and system locations.

The intelligence database is the Naval Intelligence Processing System (NIPS), an encyclopedia like intelligence data base on various areas of the world, in addition to an automated gazetteer which allows the operator to search and locate standard place names. Locations can be displayed in latitude and longitude, Universal Transverse Mercator, or the MGRS. Planned upgrades are to transition to C2PC using the MIDB database for MSBL 1.1 and the SDS vice NIPS.

Equipment	MEF IAS - 8 Intelligence/Operations Workstations IAS Suite - AN/UYQ-69(V)1, AN/UYQ-69(V)2, JOTS-1, JOTS-19, JOTS-14 Intelligence/Operations Workstations
Data Links	USMTF, VMF (2001), OTG, IBS (2003)
Communications	AN/MS-63A (Autodin Mode I/II), HF, VHF, UHF, SIPRNet, Ethernet (TCP/IP)

Joint Strike Fighter

The Joint Strike Fighter (X-32/35) is the planned replacement for the F/A-18 and the AV-8B aircraft in the Marine Corps. The Joint Strike Fighter will have a vertical or short take off and vertical landing capability and provide close air support and battle field interdiction capability from amphibious assault ships (LHA, LHD) and aircraft carriers (CV), or from forward area land bases. Ordnance capability can be two 1,000 pound Joint Direct Attack Munitions (JDAM) and two AIM-120 AMRAAM carried internal. Options are to include an internal cannon (Mauser BK-27). Current contenders for the Joint Strike Fighter contract are Boeing and Lockheed-Martin companies. Initial flight tests are planned for 2000.

TADIL capability	TADIL J capability is under consideration.
Data Links	VMF ₁ , IBS
Radios	Joint Tactical Radio equivalent
Sensors	Radar Forward Looking Infrared Receiver Laser Spotter/Designator
Navigation	Inertial navigation system, GPS receiver
Parent Organization	Marine All Weather Attack Squadron VMA (AW)



Joint Strike Fighter

Note: 1. VMF message requirement is under consideration.

JSTARS Common Ground Station

The Joint Surveillance Target Attack Radar System (JSTARS) Common Ground Station (CGS) houses the Ground Station Terminal, JSTARS work stations, and communications equipment used to receive and process Moving Target Indicator (MTI), Fixed Target Indicator (FTI), and Synthetic Aperture Radar (SAR) data transmitted over the Surveillance and Control Data Link (SCDL). In its Light configuration, the CGS is transported with two HMMWVs. One HMMWV carries the CGS module and the other, the crew and support equipment. Each HMMWV tows a trailer with additional support equipment. The CGS work stations display JSTARS radar imagery overlaid on Defense Mapping Agency (DMA) maps to produce various products which provide imagery printouts, TACFIRE, AFATDS, and Army All-Source Analysis System (ASAS) track messages. The CGS comes with remote workstations that can be connected via LAN. The CGS is equipped with a Commanders Tactical Terminal (CTT) and interfaces to Unmanned Aerial Vehicle ground control stations (UAV GCS) and the Enhanced Tactical Radar Correlator (ETRAC).

Data and imagery capability include infra-red and low light level television, signals intelligence, and electronic intelligence.

Ground Station Module AN/TSQ-179

Ground Terminal AN/ARY-1

Data Links SCDL, ASAS, AFATDS, TACFIRE, VMF

Transport M-998 HMMWV (2) with trailers

Workstations Two internal plus remotes

Radios AN/PRC-140

System Interoperability 68030, 68040, CISC and 8800 RISC

Interfaces SCSI, RS-232 and MILSTD-1553, X-Windows, Motif, Ada

See page 3-6 for information on the SCDL.



Light Armored Vehicle-Air Defense

The Light Armored Vehicle-Air Defense (LAV-AD) will function as a mobile, low altitude, air defense weapon system in support of Marine Air Ground Task Forces (MAGTF) operations.

The LAV-AD is a variant of the Light Armored Vehicle (LAV) 25, an eight wheeled armored vehicle which is armed with the GAU-12 multi-barrel 25mm cannon and the Stinger missile system.

LAV-AD fire control includes Mark XII IFF, laser range finder, a fire control computer, forward looking infrared sight, multi-mode auto-tracker, optical sights, and a commander and gunner video display. The LAV-AD will also employ a Global Positioning System (GPS) for vehicle navigation.

The LAV-AD will employ the Data Automated Communications Terminal (DACT) with the VMF communications standard, and HF and SINCGARS radios.

Vehicle	LAV-25 Type I chassis
Missile system	Stinger AN/FIM-92 (16 rounds, 8 ready)
Sensors	IFF Mark XII Low light level television Forward Looking Infra-Red Sight Laser Range Finder
Gun system	AN/GAU-12/U 25mm (990 rounds, 385 ready)
Radios	AN/GRC-231A HF, AN/VRC-92A VHF-FM SINCGARS
Data Link	None
Navigation	2 AN/PSN-11, MV 103 LAVS Digital Compass System
Parent Organization	Light Armored Reconnaissance Battalion



Marine Air Traffic Control and Landing System

The Marine Air Traffic Control And Landing System (MATCAL) provides continuous, day and night, all weather, automated air traffic control service for expeditionary airfields and remote area landing sites.

The MATCAL provides Ground Controlled Approach (GCA) during instrument flight rule (IFR) conditions or can provide local tower control during Visual Flight Rule (VFR) conditions.

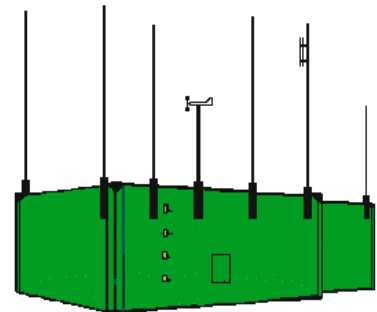
MATCAL is an automated system which exchanges air track information via TADIL B with other agencies of the Marine Air Command and Control System (MACCS) or joint interfaced agencies. MATCAL employs a variation of the Navy's Automated Carrier Landing System (ACLS) to control tactical aircraft during GCA via the TADIL C data link.

MATCAL employs both surveillance and precision approach radar for aircraft control both during approach and departure from airfields.

The planned replacement for MATCAL is the Air Surveillance and Precision Approach Radar Control System (ASPARCS). See page 4-4.

Equipment	AN/TSQ-131 Command & Communication Subsystem
Computers	AN/UYK-44
TADIL	TADIL B, TADIL C
Data Links	VMF ₁
Shelters	2 ISO 8'x8'x20'
Consoles	4 per shelter (AN/UYQ-34 multi-mode display)
Radios	1 AN/URC-94 HF 3 RT-1319 / AN/GRC-211 VHF-AM ₂ 1 RT-1523 VHF-FM ₂ 8 RT-1319 / AN/GRC-171(A)V2 UHF-AM/FM ₂
Crypto	KY-58, KY-75
Radar	AN/TPN-22 Precision Approach Radar AN/TPS -73 Surveillance Radar
ILS	AN/TPN-30 Instrument Landing System
TACAN	AN/TRN-44
Tower	AN/TSQ-120 ATC Tower AN/TRC-195 Control Central
Parent Unit	Marine Air Control Squadron (MACS)

Note: 1. VMF dependent on Navy funding of ASPARCS.
2. AN/ARC-210 w/DCS RT-1794 (C) FY2000.



Mobile Electronic Warfare Support System

The Mobile Electronic Warfare Support System (MEWSS) is a Marine Corps element of the Intelligence and Electronic Warfare Common Sensor (IEWCS) system. Using common subsystems it collects communications intelligence (COMINT) by intercepting both single channel radio and Low Probability of Intercept (LPI) signals to provide indications and warnings to operational units, and has a capability to net with US Army IEWCS platforms. When netted with another IEWCS element, the MEWSS electronic intelligence (ELINT) subsystem intercepts and provides geodetic location of radar sensors for target development. The MEWSS is transported aboard the Light Armored Vehicle (LAV) 25 and shares an on-the-move interoperability with the airborne and ground based heavy elements of IEWCS. The LAV transport system has a telescoping mast antenna that contains Mission Equipment Control Data Link (MECDL), ELINT, a four element VHF/UHF ESM array, and a Butler Matrix. MEWSS will support both HF and SINCGARS voice communications, with intercept capability for VHF ECM/ESM, UHF ECM/ESM, SHF ESM, and T&RDL. Navigation is provided by GPS.

Equipment	AN/MLQ-36A
COMINT	AN/MSR-3 TACJAM-A, CHALS-X (M)
ELINT	Common Module ELINT System
EA	AN/USQ-146
Radios	AN/VRC-92A VHF, AN/GRC-231A HF, AN/VRC-99 UHF
Data Link	Mission Equipment Control Data Link (MECDL)
Parent Unit	Radio Battalion, MEF



Mobile Electronic Warfare Support System (MEWSS) LAV-25

Multiple Source Correlation System

The Multiple Source Correlation System (MSCS) supports the Tactical Air Command Center (TACC) by providing an automated correlation function for air, surface, and ground information received from multiple sources and reported in a variety of formats. The TACC communicates with operational and intelligence elements via TADIL A, TADIL B, TADIL J, NATO Link 1, Tactical Reconnaissance Intelligence Exchange System (TRIXS), Tactical Data Dissemination System (TDDS), Tactical Information Broadcast System (TIBS), and Tactical Receive Equipment (TRE) and Related Applications (TRAP) Broadcasts, TADIXS B, and Teletype ASCII message formats.

MSCS automatically extracts information from formatted messages to create tracks, special points, and emitters. MSCS also scans each message for operator selected keywords and alerts the operator when a keyword is detected.

MSCS consists of three functional modules. The Data Processing Module maintains the database, does the correlation, provides near-real-time correlated combined intelligence to the operator and controls the operation of the MSCS. The communications processor contains guard processors that allow data dissemination at the collateral security level while the system database may contain Sensitive Compartmented Information (SCI). The display module formats MSCS information for display providing both a ground and air situation display.

MSCS provides a world wide mapping capability with information displayed against a map background in the graphic display. MSCS accepts data in various coordinate systems (Lat-Long, GEOREF, UTM, or UPS) and automatically accepts, transforms, and displays information without impacting the originating source.

MSCS can extend the air situation information beyond that provided by cooperative radar and provide track continuity by reporting intelligence track data to the radar interface for any tracks lost from radar coverage. Radar systems can be provided additional amplification data that may reflect hostile intentions or capabilities and MSCS can assume Reporting Responsibility (R^2) for tracks and points and transmit the data on the TADIL interface.

MSCS will be the interface point for the Integrated Broadcast Service (IBS) supporting the TACC.

System	AN/TYQ-101
TADIL capability	A, B, J ₁ , NATO Link 1
Data Links	TIBS, IBS ₂

Note: 1. TADIL J is implemented in MSCS software.

2. IBS will replace TDDS, TADIXS-B, TIBS and TRIXS (IOC 2003)

MV-22

The MV-22 Osprey is a vertical take off and landing, tilt rotor aircraft that will provide assault support for 24 Marines with a 200 nautical mile combat radius. The MV-22 has an aerial refueling capability to extend its range and loiter time and has a 6 x 6 x 24 foot cabin for internal cargo and two cargo hooks for external cargo loads. The MV-22 is night vision goggle compatible and uses the AN/AVS-7, a night vision goggle heads up display. Navigation is provided with an inertial navigation system, a digital color moving map display, and GPS receiver.

Initial operational capability is planned for January 2001.

TADIL Capability TADIL J capability is under consideration.

Data Links VMF₁

Radios AN/ARC-210 UHF/VHF, SINCGARS, Havequick,

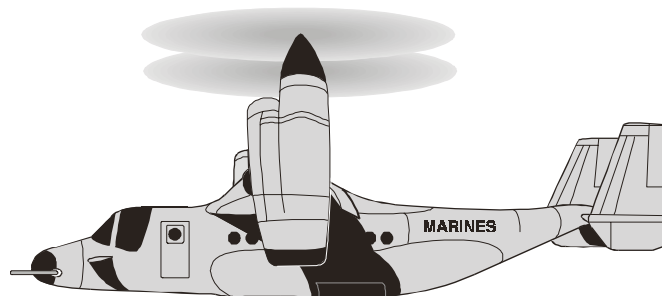
Navigation Inertial navigation, GPS receiver R-2514A₂, MAGR,
TACAN AN/ARN-153

Sensors Forward Looking Infrared Receiver AAQ-27
Radar Signal Detection Set APR-39A
Missile Warning System AAR-47
Laser Detection System AVR-2A

Ordnance Counter Measures Dispensing System ALE-47

Parent Organization Marine Medium Helicopter Squadron (HMM)

Note: 1. AN/ARC-210 with DCS RT-1747 is not compatible with the VMF protocol.
2. GPS required by 2000.



Precision Lightweight Global Positioning System

The Global Positioning System (GPS) is a DOD worldwide satellite based navigation system that provides precise time and position information. The AN/PSN-11 Precision Lightweight Global Positioning System (PLGR) receives navigation information using both the Course Acquisition (C/A) and Precision (P/Y) codes transmitted by the NAVSTAR GPS satellite system.

PLGR is a five-channel receiver suitable for use by infantry and special operations forces and can be installed in military vehicles, medium performance aircraft, and boats. It cryptographically removes Selective Availability (SA) GPS errors, and features enhanced anti-spoofing (AS) and C/A code Differential GPS (DGPS) capabilities.

The PLGR is designed for hand held operation with a rotating antenna to help viewing. A 12 button keyboard is used for direct numerical data entry and selection of all major modes of operation with a single key stroke, including online help. A remote control / mission planning station (which runs on any IBM PC compatible computer) saves time in uploading or downloading receiver data through either an RS-232 or RS-422 serial data port. The receiver also provides precision time outputs for Have Quick and SINCGARS communications radios or other military electronic systems.



This lightweight (3 pound) receiver operates in continuous, single fix, averaging, differential, time-only and automatic modes. It stores 99 way points and one user defined route consisting of 10 way points, with guidance displayed in land, sea, or air formats. PLGR offers 10 hours of continuous operation and offers three battery choices, military standard BA-5800 lithium, AA, or Ni/Cd rechargeable.

PLGR accepts and displays position data in a variety of coordinate systems, including latitude and longitude, Military Grid Reference System (MGRS), and Universal Transverse Mercator, Universal Polar Sterographic (UTM/UPS).

For mobile operations, a vehicle mount and cable set provides the power, data and remote antenna interface to the host vehicle. A latching mechanism on the mount permits PLGR to be installed or removed in under 60 seconds without tools. An optional external antenna can be located up to 5 meters from the PLGR.

PLGR+ is an enhanced version of the receiver that increases navigational functionality, 10 user definable Navigation screens, 999 way points and 15 routes with 25 legs each. Signal tracking can be achieved below -170 dbw.

PLGR+96 a further enhanced version and has features such as target interfacing with laser range finding, wide area GPS, secure Y code differential GPS, jamming direction finding and remote display terminal capability.

Prowler EA-6B

The EA-6B is a tactical electronic warfare aircraft that supports electronic combat through Electronic Warfare Support, Electronic Attack, and Electronic Protection. Information collected by the EA-6B is provided to the Marine Corps Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) through post mission data down load. This data in turn provides Electronic Intelligence (ELINT) and Signals Intelligence (SIGINT). The EA-6B also supports electronic attack through jamming or direct attack with Anti-Radiation Missiles.

Off-board sensor data is received by the EA-6B and targeting data is shared with joint forces through the Multi-mission Advanced Tactical Terminal and Improved Data Modem (MATT/IDM). The EA-6B has a TADIL C capability to support the automated landing capability afforded by the Marine Air Traffic Control and Landing System (MATCAL) and the Navy shipboard Automated Carrier Landing System (ACLS).

Fielded Equipment	EA-6B (four seat)
TADIL capability	TADIL C
Data Link	MATT/IDM, VMF ₁
Data Link Set	ASW-25B
Radios	AN/ARC-175 VHF AM/FM AN/ARC-159 UHF AM (1 data , 1 voice) AN/ARC-210 UHF/VHF AM/FM ₂ AN/ARC-105 HF AM/SSB AN/ARC-199 HF AM/SSB ₃
Sensor system	AN/ALQ-99
Comm Jamming	AN/USQ-113 (V)3 (transmitter/receiver)
Jamming	External Pod ALQ-99
Weapon Capability	AN/AGM-88 HARM
Parent Unit	Marine Electronic Attack Squadron VMAQ

Marine Corps EA-6B Squadrons: VMAQ-1 VMAQ-2
 VMAQ-3 VMAQ-4



- Notes: 1. VMF FY 2000
2. AN/ARC-210 w/DCS RT-1794(C) FY2001
3. AN/ARC-199 planned upgrade FY 2001

Radio Reconnaissance Team

The Radio Reconnaissance Equipment Signals Intelligence Suite (RREP-SS) is a signals search and analysis system for radio reconnaissance teams to gather intelligence on hostile forces. The small, lightweight, modular, computerized signals intelligence system is designed to provide a strategic link in capturing key intelligence data transmitted via HF/VHF/UHF single channel radios used throughout the world by military, police, irregular and other forces. The system is designed for radio reconnaissance teams to search numerous banks of radio frequencies and exploit hostile communications. Both digital and audio information is logged into the RREP-SS database for immediate field analysis or transmission to the TCAC over HF, UHF/VHF line of sight, or UHF satellite communications for review and interpretation.

The system allows teams to simultaneously intercept conversations in real-time, play back recorded signals, analyze digital database information, and take a line-of-bearing on received signals, while the system continues searching for additional signals. Tailored to man pack, vehicle or small boat missions it can be operated by feel under strict light or noise discipline. The system is ruggedized for deployment under adverse combat, weather, and climatic conditions. The RREP-SS can be carried as six different modules for clandestine team insertions, then reassembled in "Lego-like" fashion for full system operation in under five minutes.

EW System Radio Reconnaissance Equipment Signals Intelligence Suite

Radios: AN/VRC-92A VHF-FM, AN/PRC-104 HF-SSB,
AN/PSC-5 VHF/UHF-SATCOM, AN/PSC-2A UHF-SATCOM

Team Portable Collection System

Team Portable Collection System (TPCS) is semi-automated, man/team transportable Signals Intelligence system providing communications intercepts, direction finding (DF), analysis, reporting and collection management support. TPCS consists of a Communications Intelligence Collection subsystem that provides four Intercept/DF Outstations, an Analysis, and a Communications subsystem. TPCS and can be deployed as a stand alone system or as part of a integrated Radio Battalion effort. COMINT Collection Outstations (CC-OS) consist of one supervisor and two collection terminals and are controlled by the Analysis Subsystem (AS) via VHF radio data links. The Analysis Subsystem consists of one supervisor and four analysis terminals. The Analysis Subsystem receives tasking, translates and applies tasking to the Outstations and prepares SIGINT reports based on information received from each Outstation. The Communications Subsystem (CS) consists of two operator terminals, antennas, communications interfaces and a power source.

Equipment AN/PSQ-9, WJ-8654 receivers, AN/PRD-12 DF

Data Links ETHERNET, VMF

Communications AN/VRC-92A VHF/UHF SINCGARS, AN/GRC-231A HF, AN/PSC-3

Replacement Air Mobile Direct Air Support Center

The Replacement Air Mobile Direct Air Support Center (RAMDASC) is the planned replacement for the AN/UYQ-3A airborne DASC.

The RAMDASC will be an element of the CAC2S and employ common hardware and software modules that support each element of the MACCS. The RAMDASC will be designed to operate aboard the KC-130 Hercules and the CV-22 Osprey aircraft to support each element of the MAGTF.

The Direct Air Support Center (DASC) is the senior air support agency within its assigned sector. The DASC processes immediate direct air support requests, coordinates the employment of aircraft with other supporting arms to include artillery and naval surface fire support, and provides procedural control of aircraft within the assigned control area.

The DASC coordinates the execution of preplanned and immediate direct air support in response to the ground combat situation. The DASC assigns support aircraft to terminal control agencies; Forward Air Controller (FAC) and Airborne Forward Air Controller (FAC-A).

Equipment	RAMDASC
TADIL capability	TADIL J capability is under consideration.
Data Links	TIBS/TRAP, IBS ₁ , USMTF, VMF ₂
Shelters	Removable aircraft racks
Consoles	Workstations configurable to mission requirements
Parent unit	Marine Air Support Squadron



- Notes: 1. Integrated Broadcast Service will replace TIBS/TRAP
2. VMF is planned.

Sea Stallion CH-53

The CH-53 Sea Stallion is a heavy lift helicopter designed to provide assault support during amphibious operations from sea bases or land bases. The CH-53 can operate from amphibious ships (LST, LSD, LHA, LHD) or aircraft carriers. In its primary mission the CH-53 can carry cargo internally and externally and has an aerial refueling capability to extend its range. In its secondary mission the CH-53 provides troop assault support. The CH-53 will employ GPS and TACAN for navigation and is night vision goggle compatible.

Capability	CH-53D	CH-53E
Max Gross Weight	42,000 lbs.	73,500 lbs.
Max Passengers	37	55
Combat Range	500 nm	580 nm
Engines	2	3
Aerial Refuel	None	Probe

Data Links CH-53E VMF₁

Radios AN/ARC-182 UHF/VHF
 AN/ARC-210 UHF/VHF w/RT-1556_{2, 3}
 AN/ARC-94 HF AM/SSB (CH-53D)
 AN/ARC-174(V)2 HF AM/AME/SSB (CH-53E)

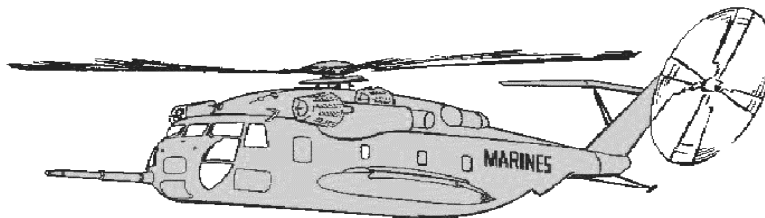
Navigation GPS, TACAN APX-72

Weapons 7.62 mm and 50 caliber door guns

Ordnance Self Defense Flares

Squadrons

CH-53D		CH-53E		
HMT-301	HMH-366	HMH-161	HMH-461	HMH-465
HMH-362	HMH-463	HMH-262	HMH-462	HMH-466
HMH-363		HMH-361	HMH-464	HMH-769



Notes: 1. CH-53E VMF implementation TBD
 2. FOC FY2001
 3. RT-1556 is not compatible with VMF protocol

Sector Anti-Air Warfare Facility

The Sector Anti-Air Warfare Facility (SAAWF) is an adjunct to the Tactical Air Operations Center (TAOC) and provides the equipment to permit the Sector Anti-Air Warfare Coordinator (SAAWC) to perform air and missile defense coordination functions. The SAAWF fuses air and space defense information received from the MAGTF and joint surveillance platforms and agencies, and displays it to the SAAWC and his staff. The SAAWF provides a capability to receive, display, and disseminate time sensitive combat information to operations centers and weapons systems that support the decentralized execution of air and theater missile defense operations.

The SAAWF operator console units receive the tactical picture from the TAOM digital data bus via an ATC Gateway that disseminates the picture via an Ethernet within the SAAWF. The operator console units are portable and can be interconnected via cable. This provides the SAAWC a capability to setup an operations center in an existing building, in a bunker, or operate from a tent.

Air mission planning information is received from the Contingency Theater Automated Planning System (CTAPS) and displayed to the operator. This provides the SAAWC an automated capability to plan future air defense operations, assume the duties of the Tactical Air Command Center as the Alternate TACC, and receive, display, store, parse, process and forward the Air Tasking Order Message to subordinate and adjacent forces.

Software support for the SAAWF is GCCS compliant and uses segments from the Joint Maritime Command Information System (JMCIS).

Equipment	AN/TYQ-87
TADIL capability	Interface to the TAOC via a Digital Data Bus to provide TADIL A, B, C, J, ATDL-1, and NATO Link 1 data to the operator workstations
Data Links	TIBS/TRAP, IBS ₁ , and VMF ₂
Consoles	4 SunSparc 20 Operator Console Units (CTAPS and TADIL data) 1 CTT-3 (AN/USC-55A) TIBS/IBS data
Parent unit	Marine Air Control Squadron

Notes: 1. Integrated Broadcast Service is replacing TIBS
2. VMF capability is planned for MSBL 1.1 and TBMCS.

Tactical Combat Operations

The Tactical Combat Operations (TCO) workstations are the equipment suite which provide automated support to the Combat Operations Center (COC) of each Command Center and each Command Post within the Marine Air Ground Task Force. TCO supports the Ground Combat Element at the Battalion, Regiment, and Division level, the Aviation Combat Element at the Squadron, Group, and Wing level, the Combat Service Support Element at the Battalion and Group level, and the Command Element at the Marine Expeditionary Force (MEF) and Marine Expeditionary Unit (MEU) levels.

TCO workstations provide map displays with overlays, friendly unit locations with status and plans of intended movement, and hostile unit locations.

TCO workstations are linked together within each COC via a local area network allowing rapid information exchange between staff sections, and they are also linked with adjacent, subordinate, and senior commands via a wide area network. TCO workstations link with the Intelligence Analysis System (IAS) for the reception of intelligence information and with the Enhanced Position Location and Reporting System (EPLRS) for friendly unit location and status information.

TCO provides an automated message generation and validation capability for the exchange of MTF messages and a capability to generate and validate Variable Message Format (VMF) messages. System enhancements are being developed through the Command and Control Personal Computer (C2PC) project and use the MAGTF Software Baseline (MSBL) common core system supporting both Unix and Windows NT.

Equipment	TCO Server/Client (TAC-4 HP 712/100) MUPAC 517 4-slot Data Silo with 2 Gig HD CD ROM 4mm Data Tape 3.5" Disk Drive TCO Client (IBM ThinkPad 770) TCIM (MD-1298/U Modem) HP Deskjet 855c Color Printer
Software	Windows NT (C2PC Version 5.4.3) UNIX (MSBL Version 1.1)
Data Link	USMTF, PLRS, EPLRS, VMF, SIPRNet
Communications	Ethernet Local Area Network Digital Secure Voice Telephone (DSVT) Tactical Combat Net Radio / TCIM OTCIXS Fleet SATCOM (MEF suite)
Encryption	STU-III

Tactical Air Command Center

The Tactical Air Command Center (TACC) functions as the combat operations center for the Aviation Combat Element of the Marine Air Ground Task Force (MAGTF). The TACC will be a Command and Control JTIDS Unit (C2JU) and will participate in surveillance, weapon coordination, and voice data exchange.

The TACC is the senior agency within the Marine Air Command and Control System (MACCS) and as such, is responsible for the overall supervision, coordination, and control of tactical air operations in the Marine Corps area of responsibility. The TACC supports three basic functions; command, operations, and planning.

The Command function is exercised by the Tactical Air Commander through direct communications with senior, adjacent, and subordinate commands and agencies, monitoring of combat through real-time displays, and through coordination with liaison officers and his aviation staff.

The operations function of the TACC insures the efficient and effective execution of the Air Tasking Order (ATO). Each scheduled flight is monitored and the take off time, mission, ordnance, aircraft number, and type, mission results, and recovery time are recorded. This real-time situational awareness allows decisions to be made that divert aircraft to higher priority missions or scramble aircraft that are on ground alert.

The planning functions of the TACC generate the ATO. Requests for air support are matched against available assets; aircraft, aircrews, ordnance, fuel, etc., and a flight schedule is produced. Sorties that can be generated in excess of the Marine Corps requirements are identified to the joint force commander and if tasked to support joint requirements are reflected in the ATO Message.

Fielded Equipment	MSCS AN/TYQ-101 and CTAPS AN/TYY-1 ₁
TADIL capability	TADIL A (1 net HF & UHF), TADIL B (8 links), NATO Link 1, TADIL J ₂ .
Terminal type	TADIL A DTS MX512P, JTIDS ₂
Data links	MTF, VMF ₃ , TIBS, TRE, TRAP ₄ , OTG
Radios	AN/GRC-171B(V)4 UHF-AM/FM, AN/VRC-83 VHF-AM, AN/VRC-90A VHF-FM, AN/ VRC-102 HF
Encryption	KGV-8, KG-40, KG-84C, KY-58, KY-65
Shelters	6 ISO 8'x8'x20' expandable / MERWS
Consoles	25 SunSparc Unix Workstations
Parent unit	Marine Tactical Air Command Squadron
External Comm	Communications Interface System AN/MRQ-12

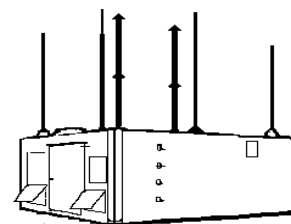
- Notes: 1. TBMCS is planned to replace CTAPS, CIS & RAAP in 2000
2. TADIL J is dependent on JTIDS terminal acquisition.
3. VMF will be supported by TBMCS in 2000.
4. Integrated Broadcast Service (IBS) is replacing TIBS/TRAP

Tactical Air Operations Center

The Tactical Air Operations Center (TAOC) is responsible for airspace control and management, surveillance, detection, identification, tracking and reporting of air and space tracks within its assigned sector. It provides navigational assistance, direction, and positive control to friendly aircraft.

The TAOC consists of the Sector Anti-Air Warfare Facility (AN/TYQ-87), one to four Tactical Air Operations Modules (AN/TYQ-23), a three dimensional air search radar (AN/TPS-59), a two dimensional air search radar (AN/TPS-63), an Air Defense Communications Platform (AN/MSQ-124), mobile electrical power generators, communications, support equipment, and personnel. Each TAOM provides four Operator Console Units, each capable of performing system initialization, surveillance, weapons control, airspace management, electronic warfare, and communications.

Intelligence information received by the TAOC is fused and track information is exchanged in real-time via data link with adjacent units, controlled aircraft, and surface to air missile units. The TAOC radars can be displaced and the sensor and Mark XII IFF data provided by fiber optic cable or radio link to the TAOM.



The TAOC controls surface to air missile fires within its assigned sector and provides a Ground Controlled Intercept (GCI) capability to fighter aircraft through data communication or voice control. Track data received by the TAOC from controlled fighter aircraft and surface to air missile units is reported to other interface participants via data link.

The TAOC has the mission of assuming the duties of the Tactical Air Command Center in the event of a catastrophic failure of the TACC. Under this tasking the TAOC becomes the Alternate Tactical Air Command Center (ATACC).

Equipment	AN/TYQ-23 (V)4 Tactical Air Operations Module AN/MSQ-124 Air Defense Communications Platform AN/TYQ-87 Sector Anti-Air Warfare Facility
TADIL capability	TADIL A (HF & UHF), TADIL B (9 links), TADIL C, ATDL-1 (14 links), NATO Link 1, TADIL J net
Radios per OM	4 AN/GRC-171(V)4 UHF-AM/FM, 2 RT3200E HF, 1 AN/VRC-83 ₁ (VHF-AM), 2 AN/VRC-88D ₁ (VHF-FM), 2 AN/VRC-89D ₁ (VHF-FM)
Data Links	USMTF ₁ , VMF ₁ , IBS ₁
Terminal type	TADIL A AN/USQ-125, JTIDS Class 2H AN/URC-107(V)10 CTT-3 (AN/USC-55A)
Encryption	KGV-8C, KG-40, KG-84C, KY-58, KY-65, KY-68
Shelters	AN/TYQ-23 4 ISO 8'x8'x20' AN/MSQ-124 1 HMMWV SCIP Shelter
Radar	1 AN/TPS-59, 1 AN/TPS-63
Parent unit	Marine Air Control Squadron

Note: 1. AN/VRC-83, AN/VRC-88D, AN/VRC-89D, USMTF, VMF, and IBS are planned upgrades.

Tactical Electronic Reconnaissance Processing and Evaluation System

The Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) is designed to process, sort, analyze, display, and correlate digital Electronic Warfare Support (ES) and Electronic Attack (EA) data intercepted and recorded by the EA-6B aircraft.

The processed data results in Electronic Intelligence (ELINT) that is used by the Air Combat Element and Ground Combat Element of the MAGTF to determine the extent of the enemy electronic threat and to plan combat operations. ES data provides specific site location and identification of RF sources.

TERPES derives near-real-time ELINT data from Tactical Receive Equipment (TRE) and from Navy and Marine Corps EA-6B aircraft. This aircraft provides post mission digital data to TERPES and TERPES processes the data and provides fused ELINT to the MAGTF commander. TERPES will also exchange information with elements of the Marine Air Command and Control System (MACCS) via Tactical Digital Information Link (TADIL) A and B providing near-real time intelligence to augment the real-time situation displays of the TACC and TAOC.

With TADIL capabilities TERPES can exchange data with other service and agency systems to amplify or confirm the identity and location of immediate threats to U.S. and allied forces.

Nomenclature	AN/TSQ-90D (V) 1 ISO 8'x8'x20'
TADIL capability	TADIL-A (HF and UHF), TADIL-B (2 links)
Data Links	USMTF, VMF ₁ , IBS ₂
Data Terminal Set	TADIL A MX512P(V)
Communications Equipment	AN/USQ-101(V)5 Tactical Receive Equipment 1 RF-590A HF Radio 4 AN/ARC-187 UHF Transceivers AUTODIN Modes I and II SIPRNet
Encryption	KG-40, KIV-7, STU-III
Consoles	4
Parent unit	VMAQ

Note: 1. VMF is planned for 2001.
2. IBS will interface with TERPES.

Tactical Remote Sensor System

The Tactical Remote Sensor System (TRSS) provides a means to monitor activity within an area of interest from amphibious shipping or MAGTF command posts ashore.

TRSS collects, records, and displays information derived from remote unattended acoustic, seismic, magnetic, infrared, and imaging ground sensors. Remote sensors may be air delivered or hand emplaced and the information they gather is transmitted via VHF radio signals to the Sensor Mobile Monitor System (SMMS). The SMMS receives, decodes, stores, and correlates sensor data, and displays the information on two operator workstations. Sensor reports can be printed or transmitted to the Intelligence Analysis System (IAS).

The radio range of TRSS sensors is extended through radio relays and repeaters (I-REMBASS). Relays are controlled from the SMMS where operators can change frequencies, monitor battery and memory status, place sensors in standby and reconfigure filters. Planned upgrades will trigger sensors to transmit stored data. Each relay can manage 126 sensors.

Remote sensor detection capabilities against personnel, vehicles and helicopters are shown in the table for each sensor type.

Sensor	Seismic	Magnetic	Infrared	Acoustic	Imaging
Personnel	15-85 m	3 m	10 m	N/A	3 m
Vehicle	50-300 m	35 m	50 m	600-800 m	30 m
Helicopter	N/A	N/A	N/A	2000 m	N/A

TRSS	AN/GSQ-261
Sensor Mobile Monitor	AN/MSC-77, HMMWV transportable, 2 workstations
Portable Monitor	AN/USQ-121
Ground Sensors	AN/GSQ-257 (Suite is 144 sensors)
Equipment	Intelligence/Operations NT Workstations
Data Links	MTF, VMF ₁
Communications	2 AN/VRC-88 VHF-FM SINCGARS 1 AN/GRC-213A HF with KY-99 16 VHF & 1 UHF Sensor Receivers
Modem	SP TCIM MD1298/U
Sensor Radio Relay	RE-1162/VHF
Radio Relay	AN/GSQ-80A (RT-1175)
Repeater	US Army I-REMBASS
Software	Remote Sensor Management System (RSMS) 2.0 & C2PC 5.4 Apr 99 (NT)
Electrical Power	MEP-803
Parent Organization	Ground Sensor Platoon, Radio Battalion

Note: 1. VMF is planned for 2001.

Target Location Designation and Handoff System

Under development, the Target Location Designation and Handoff System (TLDHS) is a man portable equipment suite that provides the Forward Observer (FO), Forward Air Controller (FAC), Naval Gunfire Spot Teams, and Reconnaissance Teams with the ability to accurately determine a targets geodetic position and to designate targets to weapons systems. Once acquired, target data can be digitally transmitted to control agencies and weapons delivery platforms.

Accurate observer location data is obtained from a Global Positioning System (GPS) receiver using the Precise Position Service (P/Y) code. This data combined with accurate target position data obtained through the integration of a laser range finder with a vertical angle and target azimuth sensor provide accurate target location data. The target location data and observer location data can then be transmitted as pre-formatted or free text messages using the Rugged Computer Subsystem to enter data in select menus for transmission over a secure jam resistant single channel tactical radio.

The TLDHS will also incorporate a laser designation capability for the control of Precision Guided Weapons delivered by naval surface fire support, tube or rocket artillery, or aircraft.

Components	Rugged Computer Subsystem, Target Location Subsystem, Target Designator Subsystem
Radio options	AN/PRC-104, AN/PRC-77, AN/PRC-113
Target location	Day: optical, Night: thermal weapons sight
Navigation	Global Positioning System (GPS)
Data Link	VMF (2001)
Encryption	TSEC/KYK-13 or AN/CZY-10



Technical Control Analysis Center

The Technical Control Analysis Center (TCAC) is a semi-automated signals intelligence (SIGINT) system which will intercept, direction find, process, analyze and disseminate SIGINT derived intelligence reports. The TCAC system is integrated into a single SICPS shelter which is mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). This standard tactical shelter houses essential computer and communications resources. Internal and external workstations can be connected via a local area network to extend the functional capabilities of the TCAC to multiple users. The system is modular in design to allow stand alone operations in dynamic expeditionary operations. Voice and data communications and SIGINT processing will support and automate the management and dissemination of SIGINT derived intelligence reports.

The TCAC shelter contains the power distribution unit, signal entry panel, bridge/router, Ethernet hub, and communications equipment. The server will be connected to three workstations on a LAN. The HMMWV will tow an electrical generator to provide all system power. Each Remote Analyst Workstation will provide SIGINT/EW fusion and automatically correlate and provide map graphic displays of incoming ELINT and COMINT. The workstations also provide operational control of assets, and can be linked to the TCAC via a LAN or WAN or via Tactical Communications Interface Module (TCIM) to a single channel tactical radio.

TCAC incorporates a data exchange capability using the USMTF and will incorporate Variable Message Format (VMF) and Integrated Broadcast Service (IBS) message standards.

Equipment	AN/MYQ-8 Technical Control Analysis Center
Workstations	One internal, up to 3 Remote Analyst Workstations
	AN/USC-55 Commanders Tactical Terminal ₁
TADIL Capability	None
Data Links	LAN (Ethernet), MTF, VMF ₂ , IBS ₃ , TRE
Radios	AN/VRC-92A VHF/UHF SINCGARS, AN/GRC-231A HF, AN/PSC-5 UHF SATCOM
External Comm	AN/TSC-120, AN/MSC-63A
Encryption	KIV-7
Modem	TCIM MD1298/U
Shelter	One Shelterized-Integrated Command Post (SICP) Shelter mounted on a HMMWV
Parent Unit	Radio Battalion, Marine Expeditionary Force (MEF)

Note: 1. Commanders Tactical Terminal (CTT/H3) replaces TRE.
2. VMF is planned for 2001.
3. IBS is planned for incorporation.



CHAPTER 5

MESSAGE STANDARDS



"B" Series Messages

B.0	Test Message
B.1	Data Reference Position Message
B.2	Air Track Position Message
B.82	Air Track Position Amplify Message
B.4	Extended Track /Point Message
B.5	Special Point Message
B.85	Special Point Amplify Message
B.6A	ECM Data Intercept Message
B.6B	ESM Primary Message
B.86B	ESM Amplify Message
B.6C	ESM Parametric Message
B.86C	ESM Parametric Amplify Message
B.7A	Data Buffer IFF Message
B.7B	Data Buffer Initialization Message
B.7C	Data Buffer Continuation Message
B.9A	Information Management Message
B.9B	Pairing/Association Message
B.9C	Pointer Message
B.9E	Track Number Management Message
B.11D	IFF/SIF Message
B.11M	EW/Intelligence Message
B.811M	EW/Intelligence Amplify Message
B.12.31	Timing Message
B.14	Weapons/Engagement Status Message
B.15	Command Message



"B" series messages support the ATDL-1 data link.

"F" Series Messages

F00.0	NU Performance
F00.1-0	EW Bearing Initial
F00.1-1	EW Fix Initial
F00.1-2	EW Position
F00.1-3	EW Amplifying
F00.2-0	EW Area of Probability Initial
F00.2-1	EW Area of Probability
F00.3-0	EW Emitter and ECM
F00.3-1	EW Frequency
F00.3-2	EW PD/PRF/Scan
F00.3-3	EW Platform
F00.4-0	EW Coordination Initial
F00.4-1	EW Association
F00.4-2	EW Coordination ECM
F00.4-3	EW Coordination Emission Control
F00.7-0	Frequency Allocation
F00.7-1	Network Media Parameters
F00.7-3	Network Management Order
F00.7-3P	Network Management Order with Parameters
F00.7-5	Radio Silent Order
F00.7-6	Network Status
F007-7	MASN
F00.7-7	Network Status
F00.7-7C	MASN Create
F00.7-7M	MASN Modify
F00.7-10	Key Rollover
F01.0-0	IFF
F01.4-0	Acoustic Brg/Rng Resolved
F01.4-1	Acoustic Brg/Rng Ambiguous
F01.5-0	Acoustic Brg/Rng Amplification
F01.5-1	Acoustic Brg/Rng Sensor
F01.5-2	Acoustic Brg/Rng Frequency
F01.6-0	Basic Command
F01.6-1	Command Extension
F01.6-2	Air Coordination
F02.0-0	Indirect PLI Amplification
F02.1-0	PLI IFF
F02.2-0	Air PLI Course and Speed
F02.2-1	Air PLI Additional Mission Correlator
F02.3-0	Surface PLI Course and Speed
F02.3-1	Surface PLI Mission Correlator
F02.4-0	Subsurface PLI Course and Speed
F02.4-1	Subsurface PLI Mission Correlator
F02.5-0	Land Point PLI Continuation
F02.5-1	Land Point PLI Additional Mission Correlator

"F" Series Messages (Continued)

F02.6-0	Land Track PLI Course/Speed
F02.6-1	Land Track PLI Mission Correlator
F02.7-0/7	ANFT TBD
F03.0-0	Reference Point Initial
F03.0-1	Reference Point Position
F03.0-2	Reference Point Course/Speed
F03.0-3	Reference Point Axis
F03.0-4	Reference Point Segment
F03.0-5	Reference Point Antisubmarine
F03.0-6	Reference Point Friend Weapon Danger Area
F03.0-7	Reference Point Theater Ballistic Missile
F03.1-0	Defense Emergency Point Initial
F03.1-1	Emergency Point Position
F03.4-0	ASW Contact Information
F03.4-1	ASW Contact Confirmation
F03.5-0	Land Track/Point Initial
F03.5-1	Land Track/Point Position
F03.5-2	Land Non-Real-Time Track
F03.5-3	Land Track/Point IFF
F1-0	Indirect PLI Position
F1-1	PLI Position
F2	Air Track Position
F3	Surface Track Position
F4-0	Subsurface Track Position
F4-1	Subsurface Track Course and Speed
F5-0	Air Track Course and Speed
F5-1	Surface Track Course and Speed
F6	EW Emergency

Note: "F" series messages support Link 22 and are derived from the 3rd Draft Edition 1, Annex B, Chapter II, STANAG 5522.

"FJ" Series Messages

FJ3.0	Reference Point Message
FJ3.1	Emergency Point Message
FJ3.6	Space Track Message
FJ6.0	Intelligence Message
FJ7.0	Track Management Message
FJ7.1	Data Update Request Message
FJ7.2	Correlation Message
FJ7.3	Pointer Message
FJ7.4	Track Identifier Message
FJ7.5	IFF/SIF Management Message
FJ7.6	Filter Management Message
FJ7.7	Association Message
FJ8.0	Unit Designator Message
FJ8.1	Mission Correlator Change Message
FJ10.2	Engagement Status Message
FJ10.3	Handover Message
FJ10.5	Controlling Unit Change Message
FJ10.6	Pairing Message
FJ13.0	Airfield Status Message
FJ13.2	Air Platform & System Status Message
FJ13.3	Surface Platform & Status Message
FJ13.4	Subsurface Platform & System Status Message
FJ13.5	Land Platform & System Status Message
FJ15.0	Threat Warning Message
FJ28.2(0)	Text Message

Note: "F/J" series messages support Link 22 and are derived from the 3rd Draft Edition 1, Annex B, Chapter II, STANAG 5522.

"J" Series Messages

Network Management

J0.0	Initial Entry Message
J0.1	Test Message
J0.2	Network Time Update Message
J0.3	Time Slot Assignment Message
J0.4	Radio Relay Control Message
J0.5	Repromulgation Relay Message
J0.6	Communications Control Message
J0.7	Time Slot Reallocation Message
J1.0	Connectivity Interrogation Message
J1.1	Connectivity Status Message
J1.2	Route Establishment Message
J1.3	Acknowledge Message
J1.4	Communicant Status Message
J1.5	Net Control Initialization Message
J1.6	Needline Participation Group Assignment Message

Precise Participant Location And Identification

J2.0	Indirect Interface Unit PPLI Message
J2.2	Air PPLI Message
J2.3	Surface PPLI Message
J2.4	Subsurface PPLI Message
J2.5	Land Point PPLI Message
J2.6	Land Track PPLI Message

Surveillance

J3.0	Reference Point Message
J3.1	Emergency Point Message
J3.2	Air Track Message
J3.3	Surface Track Message
J3.4	Subsurface Track Message
J3.5	Land Point/Track Message
J3.6	Space Track Message
J3.7	Electronic Warfare Product Information Message

Antisubmarine Warfare

J5.4	Acoustic Bearing/Range Message
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"J" Series Messages

Intelligence

J6.0 Intelligence Information Message

Information Management

J7.0 Track Management Message
J7.1 Data Update Request Message
J7.2 Correlation Message
J7.3 Pointer Message
J7.4 Track Identifier Message
J7.5 IFF/SIF Management Message
J7.6 Filter Management Message
J7.7 Association Message
J8.0 Unit Designator Message
J8.1 Mission Correlator Change Message

Weapon Coordination and Management

J9.0 Command Message
J9.1 TMD Engagement Command Message
J9.2 ECCM Coordination
J10.2 Engagement Status Message
J10.3 Handover Message
J10.5 Controlling Unit Report
J10.6 Pairing Message

Control

J12.0 Mission Assignment Message
J12.1 Vector Message
J12.2 Precision Aircraft Direction Message
J12.3 Flight Path Message
J12.4 Controlling Unit Change Message
J12.5 Target/Track Correlation Message
J12.6 Target Sorting Message
J12.7 Target Bearing
J16.0 U.S. Navy Reserved Message

Platform and System Status

J13.0 Airfield Status Message
J13.2 Air Platform & System Status Message
J13.3 Surface Platform & Status Message
J13.4 Subsurface Platform & System Status Message
J13.5 Land Platform & System Status Message

"J" Series Messages

Electronic Warfare

J14.0 Parametric Information Message
14.2 Electronic Warfare Control/Coordination Message

Threat Warning

J15.0 Threat Warning Message

Weather

J17.0 Weather Over Target

National Use

J28.0 US National 1 (Army) Message
J28.1 US National 2 (Navy) Message
J28.2 US National 3 (Air Force) Message
J28.2(0) Text Message
J28.3 US National 4 (Marine Corps) Message
J28.4 France National 1 Message
J28.5 France National 2 Message
J28.6 US National 5 (NSA)
J28.7 UK National Message
J29.0 Reserved
J29.1 UK National 2
J30.2 Italian National 1 Message
J30.3 Italian National 2 Message
J30.4 Italian National 3 Message
J30.5 French National 3 (Army) Message
J30.6 French National 4 (Air Force) Message
J30.7 French National 5 (Navy) Message

Miscellaneous

J31.0 Over-The-Air-Rekeying Management Message
J31.1 Over-The-Air-Rekeying Message
J31.7 No Statement Message

Round Trip Timing

RTT-A Round Trip Timing Interrogation: Addressed
RTT-B Round Trip Timing Interrogation: Broadcast
RTT-R Round Trip Timing Reply

Note: "J" series messages support TADIL J.

"K" Series Messages

K00 - Network Control

- K00.1 Network Monitoring Message
- K00.2 System Coordination Message
- K00.3 Security Monitoring Message

K01 – General Information

- K01.1 Free Text Message
- K01.2 Unit Reference Query/Response Message
- K01.3 Information Request Message
- K01.4 Geographical Reference Data Message

K02 - Fire Support Operations

- K02.1 Check Fire Message
- K02.2 Registration Data Message
- K02.3 Fire Support Meteorological Data Message
- K02.4 Call For Fire Message
- K02.5 Shell Report Message
- K02.6 Observer Mission Update Message
- K02.7 Survey Control Point Message
- K02.8 Schedule of Fires Message
- K02.9 Target Data Message
- K02.10 Fire Plan Mission/Fire Plan Cancellation Message
- K02.11 Ammunition Inventory Message
- K02.12 Command To Fire Message
- K02.13 Mission Clearance Message
- K02.14 Message to Observer Message
- K02.15 Fire Support Coordination Measures Message
- K02.16 End of Mission and Surveillance Message
- K02.17 Command and Control System Fire Mission Processing Message
- K02.18 Fire Unit Status Message
- K02.19 Target Query/Standing Request for Information
- K02.20 Survey Control Point Information Request Message
- K02.21 Request for Clearance to Fire Message
- K02.22 Subsequent Adjust Message
- K02.23 Fire Plan Orders Message
- K02.24 In Progress Mission Notification Message
- K02.25 End of Mission Notification Message
- K02.27 Close Air Support Request Message
- K02.28 Close Air Support Mission Battle Damage Assessment
- K02.31 Mission Request Rejection Message
- K02.32 Close Air Support Request Acceptance Message
- K02.33 Close Air Support Aircrew Briefing Message
- K02.34 Aircraft On-Station Message
- K02.35 Aircraft Depart Initial Point Message
- K02.36 Aircraft Mission Update Message

"K" Series Messages (cont.)

K02.37	Observer Readiness Report Message
K02.38	Airborne Fire Mission Message
K02.39	Fire Support Mission Planning Message
K02.40	Cannon/Mortar Command Message
K02.41	Fire Unit Deployment Command Message
K02.42	Fire Plan Assignment Data Message
K02.43	Rocket/Missile Munitions Effects Data Message
K02.44	Target Element Data Entry Message
K02.45	Rocket/Missile Launcher Order Message
K02.46	Rocket/Missile Operational Status Update Message
K02.47	Launcher Configuration Update Message
K02.48	Commander's Fire Unit Guidance Message
K02.49	Commander's Fire Mission Guidance Message
K02.50	Commander's Target Acquisition Guidance Message
K02.51	Fire Support Reply/Remarks Message
K02.52	EFOGM Unit Engagement Status Message
K02.53	EFOGM Unit Readiness and Control Message
K02.54	Howitzer Communications Initialization Data Message

K03 - Air Operations

K03.2	Initial Airborne Artillery Fire Control Radar Engagement Report Message
K03.4	Assault Support Request Message
K03.6	Mayday Message

K04 - Intelligence Operations

K04.1	SPOT / SALUTE Report Message
K04.2	Land Route Report Message
K04.3	Obstacle Report Message
K04.4	Airborne Artillery Fire Control Radar Report Message
K04.5	ELINT Description Message
K04.6	ELINT Evaluation Message
K04.7	ELINT Event Message
K04.8	Entity Emission Warning Message
K04.9	Bridge Report Message
K04.10	Initial MIJI Report Message
K04.11	ROTHR Task Report Message
K04.12	ROTHR Status Report Message
K04.13	Basic Weather Report Message
K04.14	Forecast Meteorological Data Message
K04.15	Observed Weather Information and Effects Message

"K" Series Messages (cont.)

K05 - Land Combat Operations

K05.1	Position Report Message
K05.2	NBC One Report Message
K05.3	NBC Two Report Message
K05.4	NBC Three Report Message
K05.5	NBC Four Report Message
K05.6	NBC Five Report Message
K05.7	NBC Six Report Message
K05.8	Basic Wind Report Message
K05.9	Chemical Downwind Report Message
K05.10	Effective Downwind Report Message
K05.11	Strike Warning Message
K05.12	REDCON Message
K05.13	Threat Warning Message
K05.14	Situation Report Message
K05.15	Field Orders Message
K05.16	Land Minefield Laying Report Message
K05.17	Overlay Message
K05.18	MOPP Message
K05.19	Entity Data Message
K05.20	Execution Matrix Message

K06 - Maritime Operations

K06.1	Tactical Data Link/Radar Description Message
K06.2	Location Event Message
K06.3	PING Message
K06.4	Mobile Array Status Message
K06.5	ACINT Evaluation Event Message
K06.6	ACINT Detection Event Message
K06.7	Platform Description Message
K06.8	4-Whiskey Message
K06.9	Screen Kilo Message

K07 - Combat Service Support

K07.1	Medical Evacuation Request Message
K07.2	Casualty Report Message
K07.3	Logistics Report Message
K07.4	Personnel Status Message
K07.5	EPW/Detainee Evacuation Request/Response
K07.6	CTIL/BRIL Action Message
K07.7	Medical Unit Situation Report Message
K07.8	Mortuary Affairs Situation Report Message
K07.9	Supply Point Status Report Message
K07.10	Emergency Resupply Request Message
K07.11	Emergency Resupply Request Response Message
K07.12	Task Management Message

"K" Series Messages (cont.)

K08 - Special Operations

K08.1 Prepositioned Supply Report Message

K10 - Air Defense / Air Space Control

K10.1 Hostile Aircraft Sighting Report Message

K10.2 LAAD Damage Assessment Report Message

Note: "K" series messages support VMF.



"M" Series Messages ₁

<u>Message</u>	<u>Purpose</u>
M.0	Test Message
M.1	Data Reference Position Message
M.81	Data Reference Position Amplify Message
M.2/82	Air Track Position/Air Position Amplify Message
M.3/83	Surface Track Position/Surface Position Amplify Message
M.4A thru D	Antisubmarine Warfare Primary/Secondary Message
M.84A/C/D	ASW Amplification Message
M.5/85	Special Points Position/Special Points Amplify Message
M.6A	Electronic Counter Measures Intercept Data Message
M.6B	ESM Primary Message
M.86B	ESM Amplify Message
M.6C	ESM Parametric Message
M.86C	ESM Parametric Amplify Message
M.6D	Electronic Warfare Coordination & Control Message
M.86D	Electronic Warfare Coordination & Control Amplify Message
M.7A/B	Theater Missile Defense ₂
M.87 A/B	Theater Missile Defense Amplify Message ₂
M.9A0	Information Management Message (Data Source & Sim)
M.9A1	Information Management Message (ID Difference)
M.9A2	Information Management Message (Change Data Order)
M.9A3	Information Management Message (Data Update Request)
M.9A4	Information Management Message (Drop Track)
M.9A5	Information Management Message (Track Alert)
M.9A6	Information Management Message (Controlling Unit Report)
M.9A7	Information Management Message (Terminate Track Alert)
M.9A9	Information Management Message (IFF Mgt. Message)
M.9B	Information Management Message (Pairing)
M.9C	Information Management Message (Pointer)
M.9D	Information Management Message (TADIL A Monitor)
M.9E	Information Management Message (Supporting Information)
M.9F/89F	Area of Probability Message
M.9G	Data Link Reference Point Message
M.10A	Aircraft Control Message
M.11B	Aircraft Status Message
M.11C	ASW Aircraft Status Message
M.11D	IFF/SIF Message
M.11M	Intelligence Information Message
M.811M	Intelligence Amplification Message
M.12.31	Timing Message
M.13	Worldwide National Message
M.14	Weapon / Engagement Status Message
M.15	Command Message

Note: 1. "M" series messages support TADIL A and TADIL B
 2. Limited implementation.

Message Text Format Messages

Air Operations Management

Tactical Operations Data	TACOPDAT
Airspace Control Means Request	ACMREQ
Airspace Control Order	ACO
Operational Tasking Data Link	OPTASK LINK

Air Defense Messages

Air Defense Warning Message	AIRDEFWARN (Voice)
Air Defense Command Message	AIRDEFCON (Voice)
Electronic Attack Data Message	EADAT (Voice)
Engagement Status Message	ENGSTS (Voice)
Alert Aircraft/SAM Status Message	ACSAMSTAT
Defensive Aircraft Status Message	DACREP (Voice)
SAM Status Report Message	SAMREP (Voice)

Airspace Control Message

Flight Control Information Message	FLTCONTINFO
Airbase Status Report Message	ABSTAT
Track/Point Report Message	TRKREP (Voice)
Track Management Message	TRKMAN (Voice)
Handover Message	HANDOVER (Voice)
In-Flight Report Message	INFLIGHTREP (Voice)

Air Tasking Procedure

Air Support Request	AIRSUPREP
Air Request Support	AIRREQSUP (Voice)
Air Request Jammer	AIRREQJAM (Voice)
Air Request Reconnaissance	AIRREQRECON (Voice)
Air Allocation/Request	ALLOREQ
Sortie Allotment	SORTIEALOT
Air Tasking Order	ATO
Air Tasking Order Conformation	ATOCONF
Request Conformation	REQCONF
Air Mission Request Status/Tasking	REQSTATASK
Alert Launch Order	ALORD
Joint Launch Report	JLNCHREP

Search and Rescue Messages

Search and Rescue Incident Report Message	SARIR
Search and Rescue Situation Report Message	SARSIT
Search and Rescue Request Message	SARREQ
Search Action Plan	SEARCHPLAN

Tactical Air Control Message

Air Strike Brief Message	AIRSTRIKBRIEF (Voice)
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Message Text Format Messages

Fixed-Wing Airlift/Air Refueling Messages

Airlift Request	AIRLIFTREQ
Airlift Mission Schedule	ALMSNSCD
Joint Airlift All Schedule Message	JALSCD
Joint Airlift Schedule Request Message	JALSCDREQ
Joint Airlift Diplomatic Clearance Message	JALDIP
Joint Airlift Report Request Message	JALRPTREQ
Joint Airlift Human Remains Message	JALHMNRMS
Joint Airlift Mission Load Data Message	JALLOAD
Joint Airlift Mission Advisory Message	JALADV
Joint Airlift Mission Arrival Time Message	JALARR
Joint Airlift Mission Departure Time Message	JALDEP
Joint Air Refueling Event Message	JAREVENT
Joint Air Refueling Track Message	JARTRACK
Joint Crew Status Message	JCREWSTAT
Joint Tail Number Assignment Message	JASGNTAIL
Joint Mission Status Message	JMSNSTAT
Joint Controller Remarks Message	JCRMK
Joint Maintenance Assistance Message	JALMXASSIST
Joint Maintenance Status Message	JALMXSTAT
Joint Airlift System Reject Message	JSYSREJECT

Planning/Execution of Combat Operations Messages

Order Message	ORDER
Operational Plan/Order Change	PLANORDCHG
Rules of Engagement Authorization	ROEAUTH
Rules of Engagement Implementation	ROEIMPL
Rules of Engagement Request	ROEREQ

Operation Situation/Status Reporting Messages

Commander's Evaluation Report	CDREVALREQ
Course of Action Evaluation Response	COAEVALRESP
Commander's Estimate	CDRESTIMATE
Deployment Report	DEPREP
Equipment Causality Report	CASREP
Graphic Report Overlay	GRAPHREP-OVERLAY
Highway Situation Report	HWYSITREP
Joint Mine Laying Operations	MINEOPS
Joint Mine Countermeasures Operations	MCMOPS
MCM Report	MCMREP
Mining Report	MLAYREP
MCM Tasking	OPTASK MCM
Mining Tasking	OPTASK MINING
Q-Message / Mine warning	Q-MWARN

Message Text Format Messages

Operations Situation/Status Reporting Messages (Cont)

Joint Resource Assessment Database Report	JADREPD
Mission Report	MISREP
Operations Summary	OPSUM
Personnel Status Report	PERSTAT
Reconnaissance Nickname Report	RECON 1
Reconnaissance Track Report	RECON 2
Reconnaissance Mission Scheduling Report	RECON 3
Reconnaissance Following Report	RECON 4
Sensitive Information Report	SIREP
Sensitive Information Summary Report	SISUM
Ship Status Report	SHIPSTATREP
Tactical Report	TACREP

Event/Incident Report Messages

OPREP-3	OPREP-3
OPREP-3 BENT SPEAR	OPREP-3BS
OPREP-3 FADED GIANT	OPREP-3FG
OPREP-3 PINNACLE	OPREP-3P
OPREP-3 PINNACLE BROKEN ARROW	OPREP-3PBA
OPREP-3 PINNACLE COMMAND ASSESSMENT	OPREP-3PCA
OPREP-3 PINNACLE EMERGENCY DISABLEMENT	OPREP-3PED
OPREP-3 PINNACLE EMPTY QUIVER	OPREP-3PEQ
OPREP-3 PINNACLE EMERGENCY EVACUATION	OPREP-3PEV
OPREP-3 PINNACLE FRONT BURNER	OPREP-3PFB
OPREP-3 PINNACLE LERTCON STATUS OFACTION	OPREP-3PLSOA
OPREP-3 PINNACLE NUCFLASH	OPREP-3PNF

Report of Nuclear, Biological, Chemical Attack Messages

Friendly Chemical Strike Warning	CHEMWARN
NBC-1	NBC1
NBC-1 Summary Report	NBC1SUM
NBC-2	NBC2
NBC-2 Summary Report	NBC2SUM
NBC-3	NBC3
NBC-4	NBC4
NBC-5	NBC5
NBC-6	NBC6
National Military Intelligence Center Bulletin	NMIC BULLETIN
NBC Basic Wind Message	NBC BWR
NBC Chemical Down Wind Report	NBC CDR
NBC Effective Down Wind Report	NBC EDR
Summary Report Nuclear Detonations	NUCDETSUM
Friendly Nuclear Strike Warning	STRIKWARN (NUC)

Message Text Format Messages

Intelligence Messages

Bomb Damage Assessment Report	BDAREP
C3 Status Report	C3REP
Close Air Support Summary Report	CASSUM
Defense Intelligence Digest	DID
Daily Intelligence Summary	DISUM
Imagery Information Need Specification	IINS
Imagery Interpretation Report	IIR
Interdiction Message	INTERDICTION
Intelligence Collection Nomination	INTCOLLNOM
Intelligence Situation Summary Report	INTELSITSUM
Intelligence Report	INTREP
Intelligence Request	INTREQ
Intelligence Summary Report	INTSUM
Joint Remote Sensor Report/Request	JRSRR
Joint Tactical Surveillance Request	JTACSURVREQ
Order of Battle Report	OBREP
Preliminary Technical Report	PRETECHREP
Reconnaissance Exploitation Report	RECCEEXREP
Sensor Report	SENRP
Sensor Tactical Contact Report	SENSOREP
SPOT Intelligence Report	SPIREP (C115)
Target Bulletin	TARBUL
Target Information Report	TGTINFOREP

Electronic Warfare Messages

COMINT Advisory Tasking Message	COMINTADTSK
ELINT Requirement Tasking Message	ERTM
Electronic Warfare Approval	EWAM
Electronic Warfare Deconfliction	EWDECONFLICT
Electronic Warfare Employment	EWEM
Electronic Warfare Mission Summary	EWMSNSUM
Electronic Warfare Requesting/Tasking	EWRTM
SIGINT/EA Planning/Coordination Message	SIEPCM
Stop Jamming	STOP JAMMING
Tactical Electronic Intelligence Report	TACELINT

Communications-Electronics Messages

Broadcast Screen Request	BSR
Collective (AIG/CAD/Task)	COLLECTIVE
Communications Traffic Summary	COMTRAFICSUM
Communication-Electronic Equipment Status	COMM-EQUIPSTAT
Communications Guard List Request	COMMGRDLST
Communications Guard Shift	COMMSHIFT
Communications SPOT Report	COMSPOT
Communications Technical Report	COMTECHREP
Meconing Interference Jamming Intercept Report	MIJIFEEDER

Message Text Format Messages

Satellite Management Messages

GMF Satellite Access Authorization	GMFACCESSAUTH
GMF Satellite Access Request	GMFACCESSREQ
GMF Satellite Mission Cancellation Request	GMFCANCREQ
GMF Satellite Access Denial	GMFDENIAL
UHF Satellite Access Approval	UHFACCESSAPPR
UHF Satellite Access Change	UHFACCESSCHANGE
UHF Satellite Access Request	UHFACCESSREQ
UHF Satellite Access Cancel	UHFCANCEL
UHF Satellite Disapproval	UHFDISAPPROVE
UHF Satellite Access Preemption	UHFPREEMPT
UHF Satellite Access Termination	UHFTERMINATE

Special Operations Messages

Beach Landing Site Nomination	BLSNOM
Fire Support Request	FIRESUPREQ
Mission Support Request	MSR
Joint Ship/Submarine Service Request	SHIPSERREQ
Reception Site Configuration	SITECONF
Reception Site Nomination	SITENOM

Fire Support Resources & Ammunition Messages

Ammunition Fire Unit-Fire Unit Status	AFU.FUS
Ammunition Fire Unit-Firing Site Data	AFU.FSD
Ammunition Fire Unit-Ammunition Status	AFU.AMS
Ammunition Fire Unit-Ammunition Supply Rate	AFU.ASR
Tomahawk Inventory Report	TIR
Tomahawk Inventory Report Update	TIRU

Fire Support Planning and Coordination Messages

Ammunition Fire Unit-Deployment Command	AFU.DCMD
Fire-Planning Compute a Fire Plan	FP.COMPFP
Fire Planning-Fire Plan Target List	FP.FPT
Fire Planning Nuclear Schedule	FP.NUCSCD
Fire Planning-Reserve Fire Unit	FP.RESFU
Fire Support Element-Nuclear Allocation	FSE.ALLOC
Fire Support Element-Friendly Unit Location	FSE.FRD
Launch Sequence Plan (Tomahawk)	LSP
Modification-Attack Criteria	MOD-ATTACK
Modification-Execution Criteria	MOD-XCLUDE
Support Air Corridor	SPRT.AIRCOR
Support Battlefield Geometry	SPRT.GEOM
Support Damage Avoidance Area	SPRT-DAACAT
System-Request for Report	SYS.RFR
System-Reply or Remarks Message	SYS.RRM

Message Text Format Messages

Fire Support Mission Execution Messages

Ammunition Fire Unit - Mission Fired Report Nuclear	AFU.MFN
Ammunition Fire Unit -Mission Fired Report	AFU.MFR
Fire Mission-Call for Fire	FM.CFF
Fire Mission-Fire Mission Command	FM.FMC
Fire Mission-Message to Observer	FM.MTO
Fire Mission-Nuclear Call for Fire	FM.NCF
Fire Mission-Subsequent Adjustment	FM.SUB

Target Intelligence Acquisition Messages

Artillery Target Intelligence-Artillery Target Report	ATI.ATR
Artillery Target Intelligence-Target Criteria	ATI.TCRIT
Artillery Target Intelligence-Target Information	ATI.TIR

Survey Control Point & Meteorological Data Messages

Meteorological-Fallout	MET.CF
Meteorological-Computer	MET.CM
Meteorological-Request for MET Support	MET.RFM
Meteorological-Target Acquisition	MET.TA

Explosive Ordnance Disposal (EOD) Messages

Explosive Ordnance Disposal Support	EODSPT
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Maritime Support

Maritime Unit Mission Execution Order	GREEN
Maritime Unit TLAM Mission Order	INDIGO
Maritime Unit TLAM Mission Order Deviation	INDIGO DEVIATION Maritime
Unit TLAM Mission Firing Report	INDIGO FIRING REPORT
Maritime Force Locator Report	LOCATOR
Maritime Mission Analysis Summary Report	PURPLE
Maritime Unit ASSM Mission Order	TURQUOISE
Maritime ASSM Mission Deviation Message	TURQUOISE DEVIATION
Maritime ASSM Mission Summary Message	TURQUOISE REPORT
Maritime ASSM Mission Support Request	TURQUOISE REQUEST

Psychological Operations

Psychological Operations Report	PSYOPREP
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Administration Messages

Acknowledge Message	AKNLDG
General Administration	GENADMIN
Message Correction or Cancellation Report	MSGCORRCANX
Request for Information	RI
Response to Request for Information	RRI

Message Text Format Messages

Personnel Messages

Status of Resources & Training System Joint Report	SORTSREP
Status of Resources & Training System AF	SORTSREPAF
Status of Resources & Training System Army	SORTSREPAR
Status of Resources & Training System Navy	SORTSREPNV
Visit Request	VISITREQ

Maintenance Support Messages

Maintenance Support Request	MAINSPTREQ
Maintenance Support Response	MAINSPTRES

Transportation Message

Road Clearance Request	ROADCLRREQ
Road Clearance Response	ROADCLRRES
Transportation Support Request	TRANSSPTREQ
Transportation Support Response	TRANSSPTRES

Logistics Messages

Administrative/Logistics Order	ADMINLOGORD
Logistics Situation Report	LOGSITREP
Munitions Status Report	MUREP
ULN/UIC Movement Report	ULNUICRPT
Water Supply Point	WTRSUPPT

Medical Messages

Air Evacuation Confirmation	AIREVACCONFIRM
Air Evacuation Request	AIREVACREQ
Air Evacuation Response	AIREVACRESP
Bed Availability & Facility Status	BEDAVAIL (Voice)
Bed Designation	BEDDESIG (Voice)
Bed Request	BEDREQ (Voice)
Blood Report	BLDREP
Blood Shipment Report	BLDSHIPREP
Medical Evacuation Request	MEDEVAC (Voice)
Medical Status Report	MEDSTAT
Medical Regulating Report'	MEDREGREP

Supply Messages

Major Ammunition Malfunction	AMMOMALFUNCREP
Bulk Petroleum Allocation	POLALOT
Bulk Petroleum Contingency Report	REPOL
Bulk Petroleum Requirements Forecast	POLRQMT

Civil Affairs Messages

Civil-Military Operations Status	CIVMILSTAT
----------------------------------	------------

Message Text Format Messages

Military Postal Messages

Mail Distribution Scheme Change
Military Postal Facility Request

MAILDISTCH
POSTREQ

Military Police Messages

Enemy Prisoner of War/Civilian Internee Status
Rear Area Security Activity
Rear Area Security Request
Rear Area Protection Unit Status

EPWSTAT
RASACT
RASREQ
RAPSTAT

Graves Registration Messages

Cemetery Status
Human Remains Search & Recovery Status Report
Temporary Burial Site Request

CEMSTAT
REMAINSARSTAT
TEMPBURIALSITEREQ

Weather Messages

Severe Weather Warning
Weather forecast
Weather Observation

SVRWXWARN
WXFCST
WXOBS



"V" and "R" Series Messages

"V" Messages

V.0A	Addressed Dummy Message
V.0B	Unaddressed Dummy Message
V.1	Target Data Exchange Message (Navy)
V.2	Aircraft Vectoring Message
V.3	Vectoring and Close Control Message
V.5	Traffic Control Message
V.6	Automatic Landing Control Message
V.9	Target Information Message
V.18	Precision Direction Final Message
V.19	Precision Direction Initial Message
V.31	Inertial Navigation System Alignment Message
V.3121	Strike Control Message
MCM-1	Test Message
MCM-2	Test Message
UTM-3A	Universal Test Message
UTM-3B	Universal Test Message

"R" Messages

R.0	Aircraft Reply Message
R.1	Aircraft Reply Message
R.3A	Reply Message (Tactical Data)
R.3B	Reply Message (Position Report)
R.3C	Reply Message (Target Velocity Report)

- References:
1. MIL-STD-6004 "TADIL C Message Specifications"
 2. MIL-STD 188-203-3 "Subsystem Design & Engineering Standards TADIL C"
 3. NATO Standardization Agreement (STANAG) 5504 "Tactical Data Link for Control of Aircraft"
 4. US Navy Operational Specification (OS) 404.2

Note: "V" and "R" series messages support TADIL C.

"S" Series Messages

"S" series messages support NATO Link 1 and are classified NATO Confidential. These messages may be found in NATO document NDGX-001-RM Link-1 Interface Message Standards.

Marine Tactical Systems Messages

<u>Code</u>	<u>Report</u>	<u>Name</u>
K015	Mission History Report	
K049	Muzzle Velocity Measurement	
K072	Counter-fire Target Location Report	
K100	Displacement Report	
K125	End of Mission Assault Support	
K320	Observers Report	NBC-1
K321	Evaluated Data	NBC-2
K322	Immediate Warning Expected Contamination	NBC-3
K323	Reconnaissance Monitoring Survey Results	NBC-4
K324	Areas of Actual Contamination	NBC-5
K325	Detailed Chemical Biological Attack Information	NBC-6
K400	ELINT Data Response	
K401	In-flight Report	
K402	MIJI Report	
K403	Tactical ELINT Report (Intel Ops)	
K404	Tactical ELINT Report (Emitter Location)	
K405	Tactical ELINT (Parametric Data)	
K440	Confirmatory Beach Reconnaissance Report	CONBEREP
K441	Surf Report	SURFREP
K442	River & Estuaries Report	DELTREP
K443	Helicopter Landing Site Report	HLZREP
K444	Drop Zone Report	DZREP
K445	Terrain Reconnaissance for Air Landing Zone Report	
K446	Salute Report	
K447	Road/Route Report	
K448	Bridge Report	BRIDEGREP
K449	Spot Report	
K500	Personnel Strength Report	
K501	Personnel Status Report	
K510	Casualty Report	
K601	Fuel Report	LOGSUM
K602	Aircraft Ordnance Report	
K603	Logistics Summary Report	
K604	Rapid Request	
K700	Management Message	
K701	Position Report	
L035	Mission Summary-Type II Assault Support Msn.	
L042	LAAD Engagement Report	
L201	Hostile Aircraft Engagement Summary	
L220	Friendly Aircraft Damage Summary	
L230	Air Sortie Summary	
L231	Air-to-Air Combat Summary	

Marine Tactical Systems Messages

<u>Code</u>	<u>Report</u>	<u>Name</u>
P012	Message to Observer-Registration	
P043	LAAD Team Status Report	
P201	TAOC Equipment Status	
P202	MATCS Equipment Status	
P203	Aircraft Condition & Equipment Status	
P204	Airfield Support Equipment Status	
P205	Aircraft and Aircrew Status	
P206	Hawk Equipment Status	
P207	DASC Equipment Status	
P208	ASRT Equipment Status	
P700	LAAD Early Warning	
Q030	Air Mission Battle Damage Assessment	
Q032	Aircraft Launch Order	
Q040	Air Defense Status	
Q046	Message to Observer-High Burst Mean Point of Impact	
Q052	Subsequent Adjustment-High Burst Mean Point Impact	
Q062	Replot Target Instructions	
Q076	Cancel Target Record	
Q083	Final Protective Fires Request	
Q105	Fire and Air Support Allocation	
Q110	Friendly Nuclear Strike Warning	NUCWARN
Q114	CAS Mission Control Assignment	
Q118	Aircraft Divert Command	
Q301	Fragmentary Order	
Q302	Warning Order	
Q401	LAAD Weapons Conditions	
S022	Fire Command	
S100	Subsequent Adjustment -Fire	
U018	Mission Notification - Type V (Trajectory Shift)	
U033	Flight Profile	
U038	Position Location Information Report	
U039	Hostile Aircraft Sighting	
U053	Position Location Information-Ground Track	
U054	Position Location Information-Air Track	
U056	Track Update Rate	
U060	Message to Observer-Adjustment Modification	
U064	Aircraft Handover	
U065	ASRT Mission Aircraft	
U068	Time Check	
U076	PLRS Free Text	

Marine Tactical Systems Messages

<u>Code</u>	<u>Report</u>	<u>Name</u>
U078	PLRS Correlation Report	
U079	Air Meteorological Message	
U086	Target Number Assignment	
U113	Target Request Disapproval	
U117	Scheduled Plan Air Missions	
U119	Mission Change	
U120	Scheduled PAM Data	
U123	Message to Observer-Close Air Support	
U124	Position Location Information-Surface Track	
W030	Assault Support Request	
W055	Replotted/Recorded Target Information	
W057	Reference Point Location	
W097	Fireplan Check Fire	
W091	Planned Unit Position	
W092	LAAD Movement Order	
W200	Air Tasking Order	
W201	Air Mission Assignment Request/Order (Fixed Wing)	
W202	Air Mission Assignment Request/Order (Assault Support)	
W203	Electronic Warfare Tasking Request/Order (ECM)	
W204	Electronic Warfare Tasking Request/Order (Chaff)	
W205	Air Unit Flight Schedule	
W111	PAM Request - On Call Support	
W116	Request for Additional Sortie Allocation	

Over The Horizon Targeting (Gold)

<u>Message Name</u>	<u>Code</u>
Area of Interest	AOI
Contact Report	CONTACT
Force Over the Horizon Coordinator Situation Report	FOTC SITREP
Gridded Field	GRIDFLD
Group Track	GROUP
Joint Unit Report	JUNIT REPORT
Operational Note	OPNOTE
Overlay 1	OVLY1
Overlay 2	OVLY2
Overlay 3	OVLY3
PING	PING
Position of Intended Movement	PIM
Query	QRY
Tomahawk Anti-Ship Missile Reconstruction / Tomahawk Land Attack Missile Reconstruction	RECON
Reply	REP
Relocatable Over The Horizon Radar Status Request	ROTHRSREQ
Relocatable Over The Horizon Radar Status Report	ROTHRSTAT
Relocatable Over The Horizon Radar Task Request	ROTHRTASK
Satellite	SATELLITE
Screen Kilo	SCRNKILO
4-Whiskey	4WHISKY
Weather Data	WEX
Enhanced Contact Report	XCTC

Developmental OTG Message Text Formats

Gridded Field	GRIDFLD
Short Contact	SCR
Weather Data	WEX



USS Saipan LHA-2

Reference: Operational Specification for the Over-The-Horizon Targeting Gold,
Revision C, Change 2 dated 1 September 1999.

FORMETS

Message

Air to Air Refueling Combined Task
 Airspace Control Means Request
 Airspace Control Order
 Air Defense Activity Report
 Air Intelligence Report
 Air Request
 Air Task
 Air Tasking Order
 Airlift Mission Coordination
 Airlift Mission Coordination Acknowledgement
 Airlift Mission Completion
 Airlift Mission Delay Report
 Airlift Mission Progress Report
 Air Transport Status Report
 Weapon Coverage Report
 Engagement of Hostile Aircraft Report
 Friendly Air Movement
 Mission Report
 NATO AEW Allotment Message
 NATO AEW Mission Report
 NATO AEW Status of Forces
 NATO AEW Request Message
 NATO AEW Tactical Control Report
 NATO AEW Time on Task Message
 NATO AEW Logistics Situation Report
 Request for Air Transport
 Air Support Response
 Surface-to-Air Missile Intelligence Report
 Sensor Coverage Report
 SHORAD Weapon/Sensor Readiness Report
 Aircraft Track Report
 Air Transportation Accept/Reject Report
 Weapon Control Order

Short Title

AARCTM
 ACMREQ ₁
 ACO ₁
 ADACTREP
 AIRINTREP
 AIRREQ
 AIRTASK
 ATO ₁
 ATCORD
 ATCORDACK
 ATMISCOMP
 ATMISDEL
 ATMISPROG
 ATSTAT
 COVREP
 ENGAGEREP
 FAM
 MISREP
 NAEW ALLOT ₁
 NAEW MISREP
 NAEW OPSTAT
 NAEW REQ
 NAEW TACREP
 NAEW TOT
 NAEW LOGSITREP
 NARAT
 RESPONSE
 SAMINTREP
 SENSICOVREP
 SHREDREP
 TRACKREP
 TRANSAR
 WCO

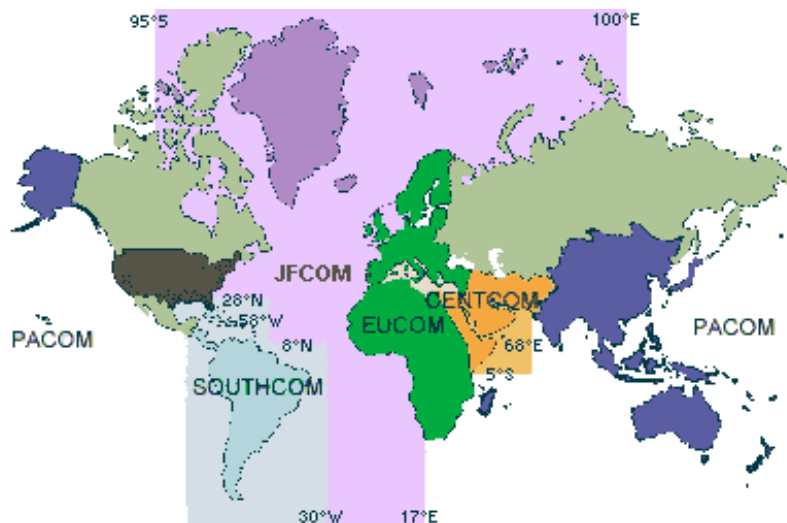
NATO Nations

Belgium	Hungary	Portugal
Canada	Iceland	Spain
Czech Republic	Italy	Turkey
Denmark	Luxembourg	United Kingdom
France ₂	Netherlands	United States
Germany	Norway	
Greece	Poland	

Note: 1. NATO-US harmonized message.

2. France is a NATO nation but is not a participant in the NATO military alliance.

U.S. Commanders in Chief Areas of Responsibility



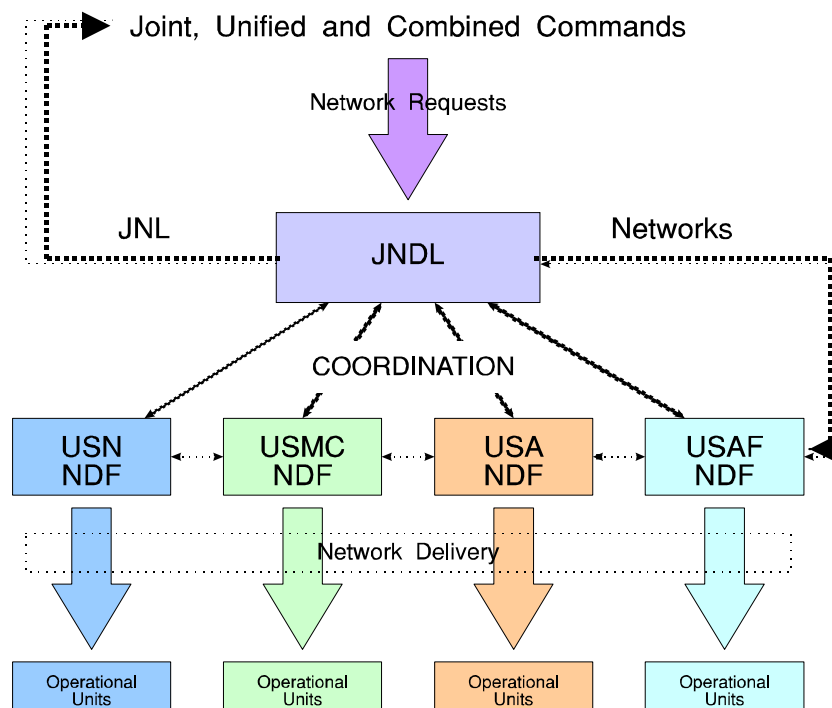
United States Central Command
United States European Command
United States Joint Forces Command
United States Pacific Command
United States Southern Command

USCENTCOM
USEUCOM
USJFCOM
USPACOM
USSOUTHCOM



CHAPTER 6

JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)



Introduction to JTIDS

JTIDS is the communications system that supports TADIL J. TADIL J data, JTIDS voice, and IJMS data are transmitted using a JTIDS or Multi-Functional Information Distribution System (MIDS) terminal. The terminal provides communications security with the Secure Data Unit (KGV-8), jamming resistance with frequency hopping through 51 discreet UHF frequencies and a Time Division Multiple Access (TDMA) scheme. These capabilities combined with the JTIDS/MIDS waveform make TADIL J a robust, secure, and reliable TADIL with a high throughput for both voice and data.

The TDMA capability of JTIDS provides a nodeless architecture with a multi-netting capability that will support up to 127 nets. In order to use TDMA each participant must have allocated time slots for transmission and reception of data. The schedule for transmission of data is called a Network Design. In a Network Design each planned participant is allocated a portion of the available time slots for transmission of its data. Each participant in the network must use the same Network Design and must have the same time reference. Time is provided to each JTIDS Participant (JU) upon entry into the network by a unit designated as the Net Time Reference (NTR). All units will synchronize their terminal time with that of the NTR unit. Once synchronized the network can operate for hours without a NTR unit.

The JTIDS architecture also provides navigation capability by measuring the time of arrival (TOA) of signals from each terminal. This information provides a form of triangulation that can provide precise location information for each JU called Relative Navigation (RELNAV). If the precise geodetic location of a JU is known, it can be designated as a Navigation Controller and its Position Quality is then transmitted on the network. Other JUs can update their geodetic position based on TOA of JTIDS signals from the Navigation Controller.

Each JU transmits its location and identification as a network participant that provides a crypto-secure means of identification comparable to Mode IV IFF. Positive identification of each JU as a Friend ID is inherent in JTIDS/MIDS design.

JTIDS provides a line of sight communications path. To extend the range between participating units beyond line of sight a data relay is used. The Network Design can provide a relay capability with up to five dedicated relay hops specified in the Network Design. An alternate relay capability is Flood Relay in which a terminal is initialized to automatically relay all data it receives. Range extension of the TADIL J message is possible by transmitting the data over an alternate communications path. This scheme normally employs the serial transmission of data via terrestrial or satellite communications.

JTIDS Network Request Procedures

1. JTIDS network designs are distributed to Marine Corps units on Compact Disk (CD). Each CD contains a library of JTIDS network designs that can be extracted from the CD and loaded into the JTIDS Module (JM) or mission support equipment. Operational parameters extracted from the Operational Tasking Data Link (OPTASKLINK) message (set 59 through 79) must also be entered to complete the terminal load in preparation for terminal initialization.
2. Specific JTIDS network designs can be requested from the Marine Corps JTIDS Network Design facility at MCTSSA, either by their network name, or by specifying the functional requirements that the network must support.
3. Network functional requirements are specified to the Marine Corps JTIDS Network Design facility on the JTIDS/MIDS Network Request Form contained on the JTIDS Library CD, or forms can be requested from the Marine Corps Network Design Facility, MCTSSA, MCB Camp Pendleton, CA 92055-5171.
E-Mail - mcndf@mctssa.usmc.mil or phone 760 725-2585, 2133, or 2796, DSN 365-2585, 2133 or 2796.
4. Upon receipt of a JTIDS/MIDS Network Request Form for a specific network, the Design Facility will withdraw the specified Network Design from the library, duplicate the package as identified by the nine character network name, produce Platform Load Files for each designated tactical data system terminal, and provide the load files to the designated units.
5. If a network is requested to support functional requirements; that is the design is not specifically requested by name, or the name is not known, a search will be made of the JTIDS Network Design Library for existing network designs which satisfy or exceed the identified requirements on the JTIDS Network Request Form. If a Network Design is located which satisfies the request, it will be identified to the requestor, and if it satisfies operational requirements, Platform Load Files for the designated tactical data system's terminal will be provide to the requesting units.
6. If no existing network meets the specified requirements, the Marine Corps JTIDS Network Design facility will design a new network, or modify an existing network to meet the specified requirements. For joint operations the parent Service Network Design Facility of the unit or agency requesting a network is normally tasked to support the design request. Requests received from Combatant Commands that require a new or modified network design will normally be designed by the Service Network Design Facility that supports the CINC's service component.
7. Joint JTIDS network designs are distributed to each Service Network Design Facility for distribution to their service components on appropriate media to support the service system's terminal configuration.

JTIDS Transmission Restrictions & Deconfliction Procedures

Each country regulates the use of radio frequencies within its own borders to minimize mutual interference. JTIDS transmissions are regulated because JTIDS operates in the frequency band allocated for world wide aircraft radio navigation. To request frequency allocation the TADIL planner needs to determine the appropriate Interference Protection Feature required of the JTIDS terminals, in addition to complying with JTIDS transmission and deconfliction procedures. US policy for deconflicting JTIDS within the US and its territories is contained in CJCSI 6231.01.

US Civil Restrictions on JTIDS Transmission

Users should verify, through their respective frequency managers, what the actual JTIDS restrictions are for the Operations Area requested. The restrictions contained in a specific frequency assignment, for a particular area, always take precedence. Operational requirements which exceed those of a particular Operations Area can be requested but must be submitted with sufficient justification and are handled on a case-by-case basis.

Frequency Assignments

Prior to transmitting on JTIDS, an approved frequency assignment or clearance must be granted. Frequency assignments can take from 90 to 120 days depending on whether an existing frequency assignment is in place. Most countries have established procedures for requesting frequency assignments and have also established restrictions on JTIDS use. JTIDS use requests are submitted as GENADMIN messages with the following minimum information.

- Area of operations
- Participating platforms
- Stop Buzzer POC
- Time period of operations
- Maximum calculated Time Slot Duty Factor (TSDF)
- Network Design to be used
- Crypto
- Justification

JTIDS Frequency Deconfliction Server

US Forces Command operates a web site that provides a means of announcing to the JTIDS community, the time, location, and participants which plan to employ JTIDS. This provides a means to coordinate the use of Operations Areas by multiple forces without exceeding the allowable time slot duty factor approved for each area.

URL address is: <http://www.forscom.army.mil/interop>

JTIDS Network Participating Groups

NPG-1	Network Entry
NPG-2	RTT-A
NPG-3	RTT-B
NPG-4	Network Management
NPG-5	PPLI A
NPG-6	PPLI B
NPG-7	Surveillance
NPG-8	Mission Management / Weapons Coordination
NPG-9	Control
NPG-10	Electronic Warfare
NPG-11	Not used by US platforms
NPG-12	Voice A
NPG-13	Voice B
NPG-14	Reserved joint use (USN Indirect PPLI Interim Use Only)
NPG-15	Reserved joint use (THAAD Interim Use Only)
NPG-16	Reserved joint use (THAAD (Interim Use Only)
NPG-17	Not used by US platforms
NPG-18	Reserved joint use (USN Interim Use Only)
NPG-19	Fighter-to-Fighter JU A
NPG-20	Fighter-to-Fighter JU B
NPG-21	Engagement
NPG-22	Composite A
NPG-23	Composite B
NPG-24	Not used by US platforms
NPG-25	Reserved joint use (THAAD Interim Use Only)
NPG-26	Not used by US platforms
NPG-27	Joint Net PPLI
NPG-28	Distributed Network Management
NPG-29	Residual Messages
NPG-30	IJMS P Message, Position
NPG-31	IJMS T Message, Track Report
NPG-32 to 511	USA Need Lines

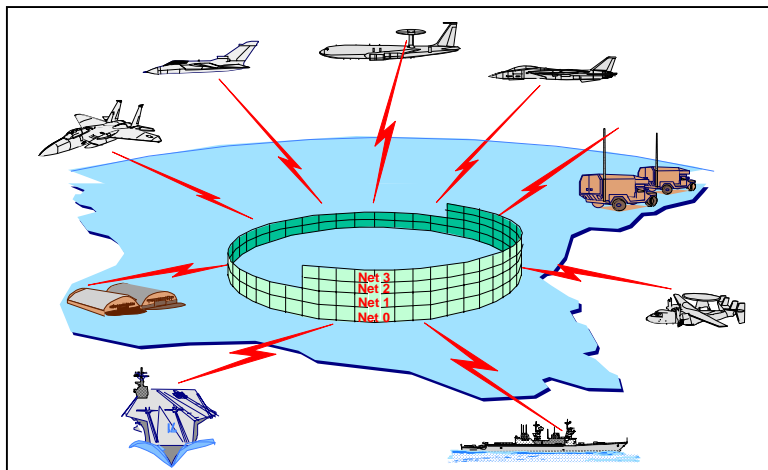
Note: An "Interim Use Only" NPG is not approved for Joint use.

JTIDS Acronyms

<u>Acronym</u>	<u>Name</u>
ANES	Alternate Network Entry Slots
AJ	Anti Jam
ATCRBS	Air Traffic Control Radar Beacon Mode S
CA	Contention Access
CHC	Current Hop Count
CPD	Cryptographic Period Designator
CVLL	Cryptographic Variable Logic Label
CVM	Cryptographic Variable Mode
DA	Dedicated Access
DME	Distance Measuring Equipment
FWF	Fixed Word Format
GDOP	Geodetic Dilution of Position
ICD	Interface Control Document
IFF	Identification Friend or Foe
IJMS	Interim JTIDS Message Specification
INCG	Interim Network Configuration Generator
INE	Initial Net Entry
IPF	Interference Protection Feature
JNDA	Joint Network Design Aid
JNL	JTIDS Network Library
JTIDS	Joint Tactical Information Distribution System
KMP	Key Management Plan
LAPWS	Link All Purpose Work Station
LOS	Line of Sight
LPE	Low Probability Exploitation
LPI	Low Probability Intercept
MIDS	Multi-Functional Information Distribution System
MSEC	Message Security
MSI	Multi-Sensor Integration
NICP	Network Interface Computer Program
NDA	Network Design Aid
NEA	Net Entry Aid
NECT	Network Entry Control Terminals
NPG	Network Participating Group
NTIA	National Telecommunications and Information Administration
NTR	Net Time Reference
OHC	Original Hop Count
OTAR	Over The Air Rekeying
P2DP	Packed Two Double Pulse
P2SP	Packed Two Single Pulse
P4SP	Packed Four Single Pulse
PG	Participating Group

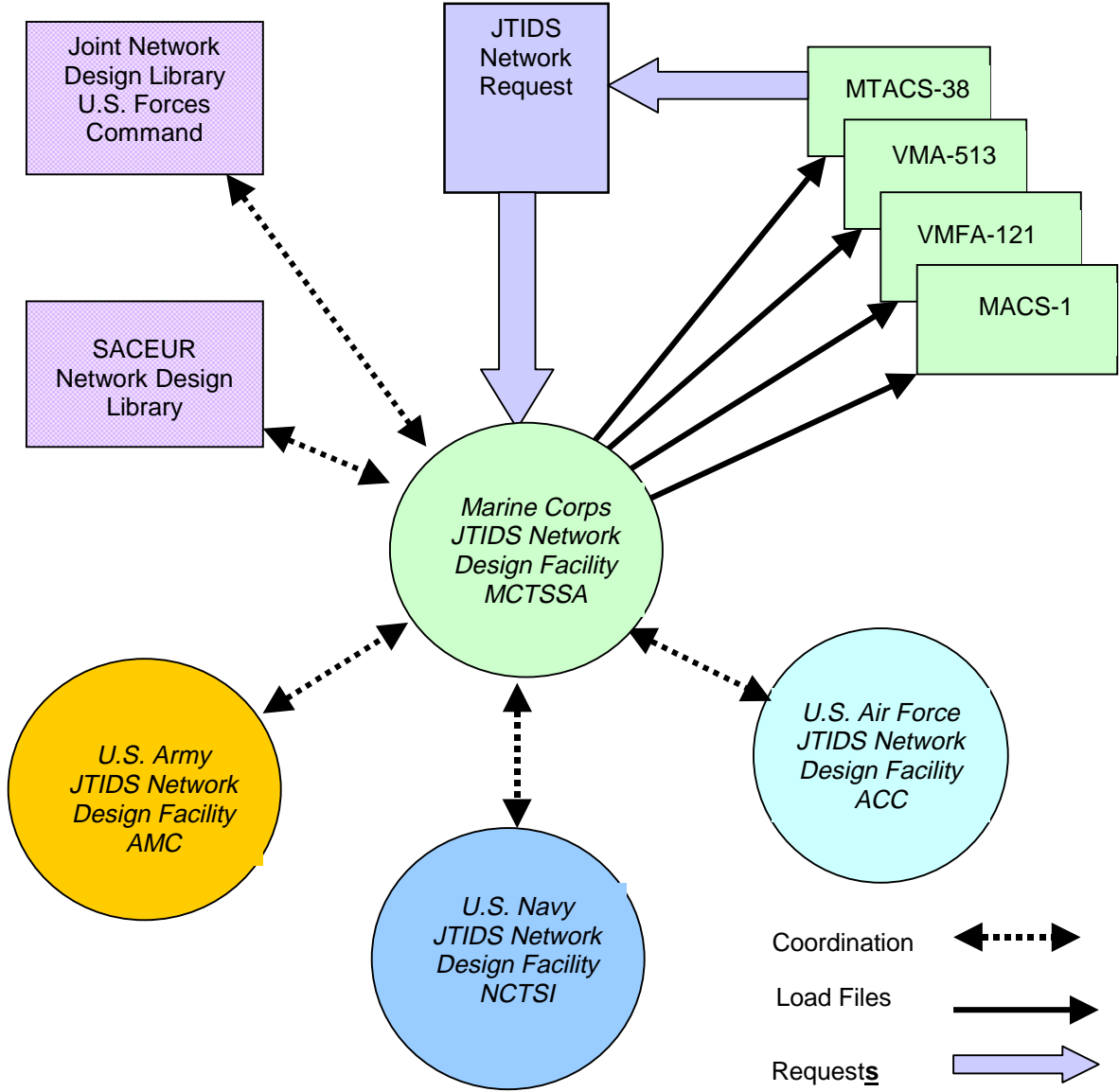
JTIDS Acronyms

<u>Acronym</u>	<u>Name</u>
PPLI	Precise Position Location and Identification
PR	Position Reference
PVM	Partition Variable Mode
PQ	Position Quality
RELNAV	Relative Navigation
RRN	Recurrence Rate
RRR	Repromulgation Recurrence Rate
RTT	Round Trip Timing
SDU	Secure Data Unit
SICP	Subscriber Interface Computer Program
STDP	Standard Double Pulse
STN	System Track Number
TACAN	Tactical Air Navigation
TADIL	Tactical Digital Information Link
TAMPS	Tactical Air Mission Planning System
TDMA	Time Division Multiple Access
TOA	Time of Arrival
TQ	Time Quality
TSB	Time Slot Block
TSDF	Time Slot Duty Factor
TSEC	Transmission Security
TSR	Time Slot Reallocation
VWF	Variable Word Format
WAS	Wide Area Surveillance



JTIDS units automatically transmit and receive data at preassigned times on preassigned nets based on instructions given to their terminals when they are initialized. These preassignments are determined in advance of operations to support the expected information exchange requirements of the force.

Marine Corps JTIDS Network Request Process



APPENDIX A

REFERENCE PUBLICATIONS



Reference Publications

Joint Publications

Joint Publication 0-2	Unified Action Armed Forces
Joint Publication 1-02	Dictionary of Military and Associated Terms
Joint Publication 3-01.4	Joint Suppression of Enemy Air Defense
Joint Publication 3-01.5	Doctrine for Joint Theater Missile Defense
Joint Publication 3-02	Doctrine for Joint for Amphibious Operations
Joint Publication 3-02.1	Doctrine for Joint Landing Force Operations
Joint Publication 3-03	Doctrine for Joint Interdiction Operations
Joint Publication 3-09.3	Doctrine for Close Air Support
Joint Publication 3-13.1	Joint Doctrine for Command & Control Warfare
Joint Publication 3-52	Doctrine Joint for Airspace Control in a Combat Zone
Joint Publication 3-55	Doctrine Joint for Reconnaissance, Surveillance, and Target Acquisition
Joint Publication 3-56.1	Command & Control for Joint Operations
Joint Publication 5-0	Doctrine for Planning Joint Operations
Joint Publication 5-0.2	Joint Task Force Planning Guidance and Procedures
Joint Publication 6-0	Doctrine for C4 System Support for Joint Operations

Military Standards

MILSTD-188-171	Interoperability Standard -Information Record Traffic I
MILSTD-188-172	Interoperability Standard -Information Record Traffic II
MILSTD-188-203-1A	Subsystem Design & Engineering Standards TADIL A
MILSTD-188-203-3	Subsystem Design & Engineering Standards TADIL C
MILSTD-188-212	Subsystem Design & Engineering Standards TADIL B
MILSTD-188-220B	Subsystem Design & Engineering Standards DMTD
MILSTD-2045-47001B	Interoperability Standard-Connectionless Data Transfer
MILSTD-6004	DOD Interface Standard TADIL C Message Standard
MILSTD-6011B	DOD Interface Standard TADIL A/B Message Standard
MILSTD-6013A	DOD Interface Standard ATDL-1 Message Standard
MILSTD-6016A	DOD Interface Standard TADIL J Message Standard
MILSTD-6040	USMTF Message Formatting Program

Technical Interface Design Plan - Reissue 4

Variable Message Format	Section 1-4 Main Document
Variable Message Format	Section 5 Message Descriptions
Variable Message Format	Appendix A - Minimum Implementation
Variable Message Format	Appendix B - Data Element Dictionary
Variable Message Format	Appendix C - Data Forwarding
Variable Message Format	Appendix D - System Implementation
Variable Message Format	Appendix E - ICP Repository

Chairman Joint Chiefs of Staff Manuals (CJCSM) / Instructions (CJCSI)

CJCSM 6120.01B	Joint Multi-TADIL Operating Procedures
CJCSM 6120.05	Joint Interface Operational Procedures for MTF
CJCSI 6212.01B	Interoperability & Supportability of National Security Systems & Information Technology Systems
CJCSI 6212.03	USMTF Program Standards CM & Implementation
CJCSI 632.01A	Deconflicting JTIDS/MIDS Operations
CJCSI 6610.01	TADIL Standardization Policy and Procedures

Reference Publications

Marine Corps Doctrine Publications (MCDP)

MCDP-1	Warfighting
MCDP-1-1	Strategy
MCDP-1-2	Campaigning
MCDP-1-3	Tactics
MCDP-2	Intelligence
MCDP-3	Expeditionary Operations
MCDP-4	Logistics
MCDP-5	Planning
MCDP-6	Command and Control

Marine Corps Warfighting Publications (MCWP)

MCWP 0-1	Marine Corps Operations
MCWP 0-1.1	Componency
MCWP 2-1	Intelligence Operations
MCWP 2-2	Intelligence Collection
MCWP 2-3	Intelligence Analysis and Production
MCWP 2-4	Intelligence Dissemination
MCWP 3-1	Ground Combat Operations
MCWP 3-16	Fire Support Coordination
MCWP 3-16.1	Marine Artillery Operations
MCWP 3-16.2	Techniques and Procedures for Fire Support Coordination
MCWP 3-16.2a	Techniques and Procedures for AFATDS
MCWP 3-16.6	Supporting Arms Observer, Spotter, Controller
MCWP 3-2	Aviation Operations
MCWP 3-22	Anti-Air Warfare
MCWP 3-22.2	Suppression of Enemy Air Defense
MCWP 3-23	Offensive Air Support
MCWP 3-23.1	Close Air Support
MCWP 3-25	Control of Aircraft and Missiles
MCWP 3-25.3	MACCS Handbook
MCWP 3-25.4	Tactical Air Command Center
MCWP 3-25.5	Direct Air Support Center
MCWP 3-25.7	Tactical Air Operations Center
MCWP 3-31.1	Fire Support in Amphibious Operations
MCWP 3-36.1	Electronic Warfare
MCWP 3-37	MAGTF NBC
MCWP 4-1	Logistics Operations
MCWP 4-1.1	Tactical-Level Logistics
MCWP 4-2	Tactical Logistics
MCWP 4-26	Supply Operations
MCWP 4-3	Operational Logistics
MCWP 5-1	Marine Corps Planning
MCWP 5-1.1	Aviation Planning
MCWP 6-2	MAGTF Command and Control Operations
MCWP 6-22	Communications and Information Systems
MCWP 6-23	Information Management

NATO Reference Documentation

STANAG 4175 Ed 2	Technical Characteristics of the Multi-Functional Information Distribution System
STANAG 5500	NATO Message Text Formatting Standard
STANAG 5501 Ed 2	Tactical Data Exchange - Link 1 (Point-to-Point) (NC)
STANAG 5504 Ed 2	Tactical Data Exchange - Link 4 (NC)
STANAG 5511 Ed 4	Tactical Data Exchange - Link 11/Link 11B
STANAG 5516 Ed 2	Tactical Data Exchange - Link 16
STANAG 5522 Ed 1	Tactical Data Exchange - Link 22
STANAG 5601 Ed 2	Standards for Interface of Data Links 1, 11, 11B, and 14 Through A Buffer (NC) Draft 1996
STANAG 5616 Ed 2	Standards for Forwarding Between Tactical Data Systems Employing Digital Data Links 11/11B & Link 16
AAP-6	NATO Glossary of Terms and Definitions
ACP 167E	Glossary of Communications-Electronics Terms
ADatP-2	NATO Glossary of Automatic Data Processing (ADP) Terms and Definitions English & French
ADatP-3	NATO Message Text Formatting System (FORMETS)
ADatP-4	Standard Operating Procedures for Link 4 (NC)
ADatP-11A	Tactical Publication for the Use of Link 11(NC)
ADatP-12	Standard Operating Procedures for the Ship-Shore-Ship Buffer (NC) Draft May 1994
ADatP-16A	Standard Operating Procedures for Link 16 (NC)
ADaP-22	Standard Operating Procedures for Link 22 (NC)
ADatP-31	Tactical Publication for the Use of Link 1 (NC)
ADatP-33	Multi-Link Standard Operating Procedures (Draft)
NDGX-101-IS	Link-1 Interface Specifications (NC)
NDGX-001-RM	Link-1 Message Standard (NC)
NDGX-101-FD	NADGE Crosstell Procedures (NC)
AEGX-101-FD	AEGIS Crosstell Procedures (NC) Detailed procedures and transmission rules.
SACEUR SUPPLAN 10001D	NATINAD, NATO Integrated Air Defense NC
MCM 35-70	Ship/Shore/Ship Facilities for the Exchange of Air Defense Information (NC)
SHAPE 1250.13/SHOPDP/78	Tri-MNC Operational Requirement for the Land Maritime Exchange of Air Surveillance Information Ship-Shore-Ship Buffer (NC)
SHAPE 1250.13.02/SHOPDP/81	Tri-MNC Operational/Requirement for the Land Maritime Exchange of Air Surveillance Information (NC)
SHAPE 6547.04.01/SHOPDS/81	Tri-MNC Operational/Requirement for NATO Ship Shore Ship Buffer (NC)
Tri-MNC Concept of Operations for the Land Maritime Exchange of Air Surveillance Information SSSB, 1251.05/ SHORF/91 (NC) 5 Feb. 1991	
International Telephone and Telegraph Consultative Committee (CCITT)	

APPENDIX B

***WEAPONS SYSTEMS
CHARACTERISTICS***



Weapons Systems Characteristics

Code Name	Type	Nomenclature	Range Miles ₁
Stinger	Surface to Air	FIM-92	4.9
RBS 70	Surface to Air	RBS 70	3
Gimlet	Surface to Air	SA-16	2
Javelin	Surface to Air		2.8
Rapier	Surface to Air	FSC	8.3
Rolling Airframe Missile	Surface to Air	RIM-116	2.4
Hawk	Surface to Air	MIM-23	24.9
Patriot PAC 2	Surface to Air	MIM-104	62
Patriot PAC 3	Surface to Air	MIM-104	115
THAAD	Surface to Air	MIM-104	NA
Standard Missile 2 AER	Surface to Air	RIM-67B	115
Ganif	Surface to Air	SA-4	34
Gainful	Surface to Air	SA-6	17
Gadfly	Surface to Air	SA-11	18.6
Sea Sparrow	Surface to Air	RIM-7M	30
Sparrow	Air Intercept	AIM-7	34
Sidewinder	Air Intercept	AIM-9	10+
Phoenix	Air Intercept	AIM-54	127
AMRAAM	Air Intercept	AIM-120	30+
Aphid	Air Intercept	AA-8	6.2
Alamo	Air Intercept	AA-10	46
Archer	Air Intercept	AA-11	24.8
Lance	Surface-Surface	MGM-52C	73
Frog 7B	Surface-Surface	9K52 Luna	43
Scud B	Surface-Surface	SS-1	186
Agni ER	Surface-Surface		2300
CSS-4	Surface-Surface	DF-15	373
CSS-5	Surface-Surface	DF-21X	1860
Taepo-Dong 1	Surface-Surface	TD-1	930
Nike-Hercules	Surface-Surface	NHK-2	160
Exocet	Anti-Ship	AM-39/MM-40	27
Zvezdo-Strela	Anti-Ship	AS-17	31
Harpoon	Anti-Ship	AGM-84F	65
Seersucker	Anti-Ship	HY-2	250
Maverick	Anti-Armor	AGM-65	17+
Hellfire	Anti-Armor	AGM-114	4.9
JSOW	Air-Ground	AGM-154A/B	46
Tow	Anti-Armor	BGM-71	2.3
Harm	Anti-Radiation	AGM-88C	80
Sidearm	Anti-Radiation	AGM-122	4.3
Tomahawk	ALCM	BGM-109B/C/D	1150

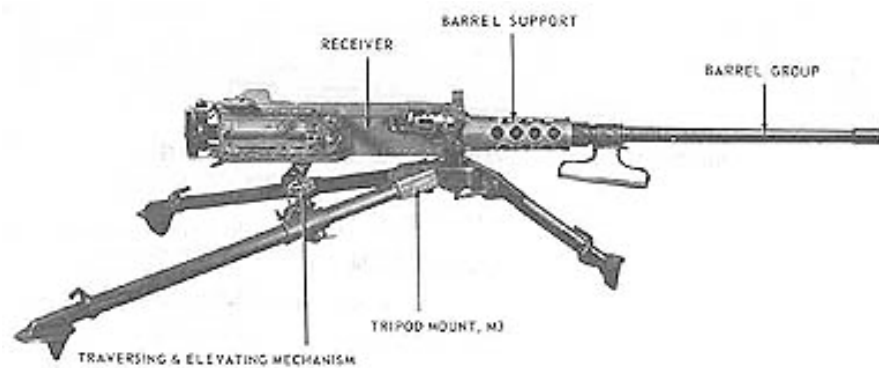
Note 1. Actual range may be classified. Ranges in statute miles provided are not classified and are dependent on aspect angle, altitude, and closing velocity (V_C).

Weapons Characteristics

Type	Nomenclature	Caliber	Range Meters ₁
Pistol	M9	9 x 19 mm	50
Rifle	M16A2 / M4	5.56 x 45mm	550 / 800
Rifle	M40A1	7.62 x 51 mm	1,000
Squad Automatic Rifle	M249	5.56 x 45 mm	600 / 1000
Machine Gun	M240G	7.62 x 51 mm	1,800
Machine Gun	M2HB / M3P	12.7 x 99 mm	1,860
Cannon	M61	20 mm	2,200
Cannon	GAU-12	25 mm	14, 800
Grenade Launcher	M203	40 x 53 mm	150 / 300
Machine Gun	Mk 19	40 x 53 mm	1,600
Rocket Launcher	SMAW	83 mm	250 / 500
Mortar	M224	60 mm	HE 3,490
Mortar	M252	81 mm	HE 5,650
Anti-Tank (LAW)	M72A6	66 mm	350
Anti-Tank (AT4)	M136	84 mm	300
Anti-Tank (Dragon)	M-47	101 mm	1,500
Anti-Tank (Javelin)		127 mm	2,500
Anti-Tank (Predator)		149 mm	600
Tank Gun	M68 (M60)	105 mm	2,000
Tank Gun	M256 (M1)	120 mm	4,000
Howitzer	M101A1	105 mm	HE 11,500
Howitzer	M198	155 mm	HE 22,000
Naval Machine Gun	Mk 38	25 mm	2,450
Naval Gun (FFG)	Mk 75	3" 62 Caliber	18,500
Naval Gun (CG/DDG)	Mk 45	5" 54 Caliber	23,100
Naval Rifle (BB)	Mk 7	16" 50 Caliber	38,000
MLRS	M270	227 mm	32,000
MLRS (ATACMS)	M270	607 mm	165,000
Pistol	PMM-12	9 x 18 mm	25
Rifle	AK-47 / AKM	7.62 x 39 mm	400
Rifle	AK-74	5.45 x 39 mm	400
Rifle	SVD / SVDS	7.62 x 54R mm	800
Rifle	AN-94	5.45 x 39 mm	600
Machine Gun	PK / PKS	7.62 x 54R mm	800
Machine Gun	DShK	12.7 x 108 mm	1,800
Machine Gun	AGS-30	30 x 29 mm	1,700
Rocket Launcher	RPG-22	68 mm	250
Mortar	2B9	82 mm	4,300
Anti-Tank Missile	Malyutka-2	125 mm	3,000
Anti-Tank Missile	Kornet-E	152 mm	5,500
Tank Gun	2A46M (T-72)	125 mm	3,000
Self Propelled Howitzer	2S5	152 mm	28,400

Note 1. Range is maximum effective range, point target / area target.

Machine Gun Caliber 50 M2HB



APPENDIX C

COMMUNICATIONS SYSTEMS



CHARACTERISTICS

Tactical Radio Equipment

Tactical System	Spectrum	Nomenclature	No	Characteristics
TACC (2 OE-334) Radios per OE-334	UHF-AM	AN/GRC-171(V)4	8	Have Quick 2, KY-58
	VHF-FM	AN/VRC-90A	3	SINCGARS
	VHF-AM	AN/VRC-83(V)3	2	KY-57
	HF-SSB	AN/VRC-102	4	
	UHF-FM	AN/USC-55 CTT(3)		TRAP, TADIXS-B, TIBS, TRIXS, KG-84, KY-57
TAOM AN/TYQ-23	UHF-AM	AN/GRC-171(V)4	4	Have Quick 2, KY-58
	VHF-AM	AN/VRC-83	1	KY-58
	VHF-FM	AN/VRC-88D	2	SINCGARS
	VHF-FM	AN/VRC-89D	2	SINCGARS
	HF-SSB	RT3200E	2	
SAAWF AN/TYQ-87	UHF-FM	AN/USC-55 CTT(3)	1	TRAP, TADIXS-B, TIBS, TRIXS, KG-84, KY-57
ADCP AN/MSQ-124	VHF-FM	AN/VRC-92A	1	SINCGARS, 50w
	HF-SSB	AN/VRC-102	1	KY-99
DASC AN/TSQ-207 (OE-167)	UHF-AM	AN/GRC-171(V)4	6	Have Quick 2, KY-58
	VHF-AM	AN/VRC-83(V)3		
	VHF-FM	AN/VRC-90A	5	SINCGARS
	HF-SSB	AN/VRC-102	4	KY-65
DASC AN/UYQ-3A	UHF	AN/GRC-171(V)2	3	Have Quick 2, KY-58
	VHF-FM	AN/VRC-90A	1	SINCGARS
	HF-AM	AN/GRC-193	2	SSB, 400w, 75 baud
JSTARS-CGS AN/TSQ-179	UHF/VHF	AN/PRC-140	1	Have Quick 2, 2/10 w
	UHF	AN/USC-55 CTT(3)	1	TRAP, TADIXS-B, TIBS, TRIXS, KG-84, KY-57
MATCAL AN/TSQ-131	UHF/VHF	AN/ARC-210		Have Quick, SINCGARS
	HF	AN/URC-94		KY-65
LAV-AD	VHF-FM	AN/VRC-92A	1	SINCGARS
	HF	AN/GRC-213	1	Voice, CW, data, 20w
TERPES AN/TSQ-90D	UHF AM/FM	AN/ARC-187		AM Secure voice KY58 30 w, FM-FSK 100w
	HF	RF590A	1	KG-40/KY-65
	UHF-FM	AN/USC-55	1	TRAP, TADIXS-B, TIBS, TRIXS, KG-84, KY-57
Avenger	VHF	AN/VRC-91A	1	SINCGARS, FM, FSK, 50w, 600 bps to 1.6 kbps
	HF	AN/PRC-104	1	Voice, CW, data, 20w
TCAC	VHF	AN/VRC-46	1	
	UHF	AN/ARC-164	1	KG-30/31, KY-57, 10 w
	SHF	AN/ARC-63A	1	KY-84C, GENSER

Tactical Radio Equipment (continued)

System	Spectrum	Nomenclature	No	Characteristics
TRSS	VHF	AN/VRC-188	2	SINCGARS
	HF	AN/GRC-231A	1	KY-99
TACP	VHF/UHF-AM	AN/PRC-113	2	Havequick 2, KY-57, 2/10w
	VHF-FM	AN/PRC-119A	2	SINCGARS
	HF	AN/PRC-104B	2	Voice, CW, data, 20w
	VHF-FM	AN/VRC-12	2	
FAC	VHF/UHF-AM	AN/PRC-113	2	Havequick 2, KY-57, 2/10w
	VHF-FM	AN/PRC-119A	1	SINCGARS
	HF-AM	AN/PRC-104B	1	SSB
FA-18C/D	UHF/VHF	AN/ARC-210 ₁	2	SINCGARS, Havequick 2
EA-6B	VHF-AM/FM	AN/ARC-175	1	
	UHF-AM	ARC-159	2	1 voice & 1 data
	UHF/VHF	AN/ARC-210 ₂	2	SINCGARS, Havequick 2
	HF-AM/SSB	AN/ARC-105 ₃	1	
AV-8B	UHF/VHF	AN/ARC-182	2	SINCGARS, Havequick 2
	AM/FM	AN/ARC-210 ₄	2	KY-58
AH-1W	UHF/VHF	AN/ARC-182	2	SINCGARS, Havequick 2
	AM/FM	AN/ARC-210 ₅	2	KY-58
UH-1N	VHF-FM	AN/ARC-114	1	KY-58
	UHF-AM	AN/ARC-159	1	KY-58
	UHF/VHF	AN/ARC-182	1	KY-58
	UHF/VHF	AN/ARC-210 ₅	2	SINCGARS ₁ , Havequick 2
		AN/ASC-26	1	C2 Package
MV-22	UHF/VHF AM/FM	AN/ARC-210 ₆	2	SINCGARS, Havequick 2, UHF DAMA SATCOM
FSCC	UHF	AN/VSQ-2C		EPLRS
	HF	AN/MRC-138B		Voice, TTY, data, 100w
FDC	UHF	AN/VSQ-2C		EPLRS
	HF	AN/MRC-138B		Voice, TTY, data, 100w
FO	VHF-FM	AN/PRC-119	2	SINCGARS
		AN/PSC-2	1	DCT
LAV-C2	VHF-FM	AN/VRC-92	4	SINCGARS
	VHF/UHF	AN/VRC-83	1	
	HF	AN/GRC-213	1	
	VHF	AN/PRC-68	1	Stowed
AAVC7	VHF-FM	AN/VRC-89D	2	1 Crew & 1 Staff
	VHF-FM	AN/VRC-92D	2	SINCGARS
	VHF/UHF	AN/VRC-83	1	
	HF	AN/PRC-104	1	

Note: 1. 1 ARC-210/RT-1556 & 1 ARC-210/RT-1794C IOC 2002
2. 2 ARC-210/RT-1556 IOC FY 2001
3. 1 ARC-199 is slated replacement
4. 2 ARC-210/RT-1556A IOC FY 2003
5. ARC-210/RT-1794C
6. 2 ARC-210/RT-1747C

Communications Systems

Nomenclature	Name	Characteristics
AN/MSC-63A	Communications Central	GENSER. DSCS, ISO Shelter
AN/TSC-120	Communications Central	AUTODIN, DSN, HF DCS, S-250
OE-334	Antenna Coupler	S-280
OE-167		S-250

Communications Switches

Name	Nomenclature	Characteristics
Switch Board	SB-22	Telephone switch
Switch Board	SB-3865(A)	Integrated circuit & packet switch
Message Switch	AN/TYC-39A	S-250 25 lines/S-280 50 lines
Telephone Switch	AN/TTC-42	S-280 90 trunks / 280 circuits
Tactical Data Switch	AN/GYC-7	12 line auto message switch

Navigation Systems

Name	Nomenclature	Characteristics
PLRS	AN/TSQ-129A	PLRS Master Station UHF, HMMWV
	AN/PSQ-4	PLRS Basic User Unit
EPLRS	AN/TSQ-158(V)4	NCS, UHF, TDMA Net, HMMWV
	AN/VSQ-2C(V)1	EPLRS User Unit, 460 users
PLGR	AN/PSN-11	GPS (1575.42 MHz/1227.60 MHz)

Communications Encryption Equipment

Nomenclature	Name	Characteristics	Application
TSEC/KY-57	VINSON	VHF-FM, UHF-AM	Manpack, Vehicle
TSEC/KY-58	VINSON	VHF-FM, UHF-AM	Aircraft, shore
TSEC/KY-65	PARKHILL	HF & Wireline	Manpack, Vehicle
TSEC/KY-67	BANCROFT	VHF-FM Transceiver	Vehicle
TSEC/KY-68	VINSON	VHF-FM	Aircraft, shore
TSEC/KY-75	PARKHILL	HF & Wireline	Aircraft, shore
TSEC/KY-99	ANDVT	HF, VHF, UHF	Aircraft, vehicle
TSEC/KG-40		TADIL A	Aircraft, ship, shore
TSEC/KG-84		Serial data	Shore
TSEC/KG-94		Synchronous, Duplex,	Shore

Data Communications Tools

Nomenclature	Use	Characteristics
AN/TRQ-43	Frequency management	Chirp sounder
LMS-4A	TADIL C link monitor	Desk top workstation
LMS-11	TADIL A net monitor & analysis	Desk top workstation
LMS-16	TADIL J net monitor & analysis	Desk top workstation
DTSS-16	TADIL J data terminal simulator	Lap top workstation
SPEED	Communications Planning	Widows 95

Satellite Communications Systems

Defense Satellite Communications Systems (DSCS)
• NCA, JCS, CINCs, DCS & other DOD
• SHF, UHF, EHF (I and J band)
Fleet Satellite Communications (FLTSATCOM) System
• EHF/SHF up link / UHF down link fleet broadcast Channel 1
• UHF up link and down link relay Channels 2-10
• UHF Channel 23
• USAF UHF Narrow band Channels 11-22
Military Satellite Communications System (MILSTAR)
• UHF/EHF uplink
• UHF/SHF downlink
UHF Follow On Satellite (UFO)
• 39 UHF & 20 EHF (AJ) Channels (Block II)
• Global Broadcast Service (GBS) (Block III)

Satellite Communications Equipment

Nomenclature	Radio	Spectrum	Characteristics
AN/TSC-85B	500 watt	H Band	6, 12, 24, 48, or 96 channels PCM 16 kbits per channel
AN/TSC-93B	500 watt	H Band	6, 12, or 24 channels PCM 16 kbits per channel
AN/TSC-96A	AN/WSC-3	UHF	Data, voice, TTY, 75 to 9.6 kbps PSK, FM 100w
	AN/WSC-6	SHF	DSCS, 64 kbps aggregate, 300 watts
	AN/USC-38	EHF	NESP (75 bps to 1.544 mbps)
AN/TSC-120	AN/PSC-5	VHF-FM	300/1200 bps, FM/PSK 20w

Radio Frequency Spectrum

Wavelength	30 M	10 M	3 M	640 CM
Frequency	10 MHz	30 Hz	100 MHz	0.5 GHz
Band	HF		VHF	A B

Wavelength	30 CM	15CM	10CM	7.5CM	5 CM	3.75CM
Frequency	1 GHz	2GHz	3GHz	4GHz	6GHz	8 GHz
Band	C	D	E	F	G	H

Wavelength	3 CM	1.5 CM	7.5 MM	5 MM	3 MM
Frequency	10 GHz	20 GHz	40 GHz	60 GHz	100 GHz
Band	I	J	K	L	M

Common Tactical Radios

System	Mode	Frequency	Modulation	Protocol
AN/ARC-94	Voice	HF	AM/AME/SSB	
AN/ARC-159	Voice/Data	UHF	AM	
AN/ARC-174	Voice	HF	AM/AME/SSB	
AN/ARC-175	Voice	VHF	AM/FM	
AN/ARC-182	Voice	UHF/VHF	AM/FM	
	TADIL C	UHF	FSK	OS-404.1
AN/ARC-186	Voice	VHF	AM/FM	
AN/ARC-190 V(3)	Voice	HF	CW/AM	
AN/ARC-190 V(8)	Voice	HF	AM/AME/SSB	
	ECCM	HF	FSK	MS-188-148 ACS-AJ
AN/ARC-210 RT-1556	Voice	VHF	AM/FM	
		UHF	AM/FM	
	SINCGARS	VHF	FM	
	Havequick	UHF	AM	
	Havequick-2	UHF	AM	
	TADIL C	UHF	FSK	OS-404.1
AN/ARC-210 RT-1747B	Voice	VHF	FM	
		VHF-ATC	AM	
	SINCGARS	VHF	FM	
	Havequick	UHF	AM	
	Havequick-2	UHF	AM	
	Satellite	UHF	FM	DAMA 181
AN/ARC-210 RT-1794C	Voice	VHF	FM	
		VHF-ATC	AM	
		Europe 8.33	AM	
	Data	VHF	FM	188-220A VMF
		UHF	AM/FM	188-220A VMF
	Havequick	UHF	AM	
	Havequick-2	UHF	AM	
		Voice		
		UHF Data	AM	188-220A VMF
	SINCGARS	VHF	FM	
		Voice		
		VHF Data	FM	188-220A VMF
	TADIL C	UHF	FSK	OS-404.1
AN/ARC-222	Voice & Data	UHF	FSK/BPSK	DAMA 181 WB/NB
		UHF	SOQPSK	DAMA 182
		UHF	BPSK/DEQPSK	DAMA 183
AN/ARC-222	Voice	VHF	AM/FM	
	SINCGARS	VHF	FM	

Common Tactical Radios (cont.)

System	Mode	Frequency	Modulation	Protocol
AN/GRC-171 V(4)	Voice	UHF	AM/FM	
	Havequick-2	UHF	AM	
	TADIL C	UHF	FSK	OS-404.1
AN/GRC-193	Voice	HF	AM/SSB	
AN/GRC-211	Voice	VHF ATC	AM	
AN/GRC-213A	Voice	HF	CW SSB	
	Data	HF	FSK	
AN/MRC-138B	Voice/Data	HF	AM/SSB	
AN/MRC-142	Voice/Data	UHF	FM	
AN/MRC-145	Voice	VHF	FM	
	SINCGARS	VHF	FM	
AN/PRC-68	Voice	VHF	FM	
AN/PRC-104	Voice	HF	SSB	
AN/PRC-113	Voice	VHF/UHF	AM	
	Havequick-2	UHF	AM	
AN/PRC-119	Voice	VHF	FM	
	SINCGARS	VHF	FM	
AN/PRC-138	Voice/Data	HF/VHF	SSB/FM	
AN/PRC-140	Voice	VHF/UHF	AM/FM	
	SINCGARS	VHF	FM	
	Havequick-2	UHF	AM	
AN/PSC-3	Voice/Data LOS/SATCOM	UHF	FM	BPSK DPSK
AN/PSC-5	Voice/Data LOS/SATCOM	VHF/UHF	AM/FM/FSK	DAMA 181 182,183
AN/TRC-170	Voice/Data LOS/Tropo	4.4 to 5 GHz	FM 24 Channel	
AN/TSC-85B	GMF SATCOM	7.25 to 8.4 GHz	PCM	DSCS
AN/TSC-93B	GMF SATCOM	7.25 to 8.4 GHz	PCM	DSCS
AN/VRC-83	Voice	VHF/UHF	AM	
	Havequick	UHF	AM	
AN/VRC-88D	Voice	VHF	FM	
	SINCGARS	VHF	FM / FSK	
AN/VRC-89	Voice	VHF	FM	
	SINCGARS	VHF	FM / FSK	
AN/VRC-90A	Voice	VHF	FM	
	SINCGARS	VHF	FM / FSK	
AN/VRC-92A	Voice	VHF	FM	
	SINCGARS	VHF	FM / FSK	
AN/VRC-102	Voice	HF	AME/SSB	
AN/WSC-3	Voice/Data LOS/SATCOM	UHF	AM/FM/FSK	
AN/WSC-6	Voice/Data SATCOM	7.25 to 8.4 GHz		DAMA DSCS



ACDS



APPENDIX D

GLOSSARY



Glossary

Bandwidth	A range of radio frequency occupied by a carrier wave that transports data.
Bit Oriented Message	Messages that use an ordering of bits to express the context information. Positionally located bit control fields are used to frame information and supervise its interchange.
Character Oriented Messages	Messages that use defined character structure from a given code set to convey context information. Character codes are used to frame data and supervise its interchange.
Combined Operations	Operations conducted by two or more allied nations acting together for the accomplishment of a single mission.
Compatibility	The ability of systems to exchange electronic signals with each other.
Concurrent Operation	Operations on TADIL A and TADIL J simultaneously, but not as a data forwarder.
Correlation	A determination that a locally derived track represents the same object or point as another track or point.
Data Link	The means of connecting one location to another for the purpose of transmitting and receiving data.
Data Looping	A situation where by the same data is received from two or more paths.
Duplex	Allowing telecommunications in opposite directions simultaneously.
Electronic Warfare Support	Those efforts which search for, intercept, identify and locate sources of radiated electromagnetic energy.
Environment	The distinction between tracks operating as air, space, surface, subsurface, or land vehicles.
Expeditionary Forces	Armed forces organized to accomplish a specific objective in a foreign country.
Filter	To inhibit the transmission or reception of data on a TADIL.
Forwarding	The retransmission, or receipt of data on one TADIL and the transmission of equivalent data on a different TADIL.
Frequency Hopping	A technique where the signal energy is spread over a large bandwidth by rapidly changing the carrier frequency in a pseudo-random manner.

Glossary

Gridlock	Data registration to synchronize all positional data to the same grid or plane of reference.
Interface	A boundary common to two or more units or systems where information exchange is achieved.
Interoperability	The ability of joint or combined systems or forces to exchange usable information.
Joint Operations	Operations involving military forces from two or more Military Departments operating under a single joint force commander.
Message Standard	A set of protocols consisting of rules, procedures, formats, data element definitions, or other conventions for information exchange and related interaction agreed upon between cooperating systems to achieve interoperability.
Overhead	Information sent with data in a message that guides and protects the data for efficient communications.
Simplex	Allowing telecommunications in only one direction at a time.
Software	The set of instructions resident in a computer which create or interpret messages, generate displays and perform calculations.
Spread Spectrum	A technique which spreads energy of a digital signal over a bandwidth that is large compared to the information rates. Used to encrypt or counter jamming.
Staff Sections	S-1 /G-1 /J-1 Personnel S-2 /G-2 /J-2 Intelligence S-3 /G-3 /J-3 Operations S-4 /G-4 /J-4 Logistics J-5 Plans J-6 Command, Control, Communications, Computers J-7 Operational Plans & Interoperability J-8 Force Structure, Resources, Assessments J-9 Experimentation Office (JFC)
Time Division Multiple Access	A netted communications scheme which allocate time slots for each net participant. During a systems allocated time slot, data will be transmitted and all other systems will receive the data.



APPENDIX E

DATA COMMUNICATIONS CAPABILITY



Belgium



Canada



Czech Republic



Denmark



France



Germany



Greece



Hungary



Iceland



Italy



Luxembourg



Netherlands



Norway



Poland



Portugal



Spain



Turkey



United Kingdom



United States



NATO

Notes



US Marine Corps Data Communications Capability

Agency/Link	A	B	C	J	ATDL	Link 22	NATO	IBS	USMTF	VMF	EPLRS	CEC	OTG	GBDL
TCO									M	V ₁	EP		OTG	
IAS								IBS	M	V ₁			OTG	
MEWSS										V ₁				
TRSS										V ₁				
AFATDS									M	V				
EPLRS											EP			
FAC										V ₁	EP			
FO										V ₁	EP			
JSTARS-CGS								IBS		V				
TACC	A	B		J ₁			NATO ₂	IBS	M	V ₁			OTG	
TAOC	A	B	C	J	ATDL		NATO	IBS	M	V ₁		CEC	OTG	
ADCP	A ₃			J	ATDL									G
LAAD-RTU														G ₁
MATCALS		B	C											
TERPES	A	B						IBS	M	V ₁				
DASC									M	V ₁				
CAC2S	A ₁	B ₁	C ₁	J ₁	ATDL ₁	22 ₁	NATO ₁	IBS ₁	M ₁	V ₁		CEC ₁		
DACT									TBD	V ₁				
F/A-18			C	J ₁						V ₁				
AV-8B				TBD						V ₁				
JSF			C ₁	TBD						TBD				
MV-22				TBD						V ₁				
CH-53E										TBD				
KC-130J				TBD						TBD				
AH-1/UH-1				TBD						V ₁				

Note 1. Planned capability 2. Receive only 3. Unfielded capability.

E-1

US Air Force Data Communications Capability

Agency/Link	A	B	C	J	ATDL	Link 22	NATO	IBS	USMTF	VMF	SADL	AFAPD	IJMS	SCDL
AOC	A	B		J					M ₁	V ₂			I	
AWACS 30/35	A		C ₃	J									I	
ABCCC				J									I ₃	
JSTARS				J									I ₃	S
CRC/CRE	A	B	C	J	ATDL		N	IBS	M ₂					
ASOC				J								AFAPD		
RAOC/SAOC	A	B		J										
IADS	A	B		J	ATDL									
TACP				J ₄						V ₄	S	AFAPD		
ABL				J										
SENIOR SCOUT	A													
SENIOR TROUPE	A	B												
RIVET JOINT	A			J				IBS				AFAPD	I ₃	
F-15 A/B/C/D/E				J									I ₃	
F-16 ₅				J ₄							S	AFAPD		
F-22				J ₄										
A-10/OA-10				J ₄							S ₅			
F-117				J ₄										
B-1 / B-2 / B-52				J ₄										
JSF ₆				J ₄										
U-2 DCGS	A	B		J ₄										
PROC	A													

Note 1. CTAPS 2. TBMCS 3. Limited to terminal translation 4. Planned capability 5. F-16 Block 30 SADL, Block 40 & 50 TADIL J 6. X-32 / X-35

E-2

US Army Data Communications Capability

Agency/Link	A	B	C	J	ATDL	Link 22	NATO	IBS	USMTF	VMF	EPLRS	CEC	IJMS	SCDL
AFATDS										V				
M3P/JTAGS				J										
Patriot	A	B		J	ATDL								I ₁	
THAAD		B		J										
MEADS ₂				J										
BDE/TMD TOC	A	B		J	ATDL								I	
FAAD C2I		B		J						V			I ₁	
AN/TSQ-73		B			ATDL									
BCS										V				
MLRS										V				
IFSAS										V				
FED/FOS										V				
Firefinder TPQ-36										V				
Firefinder TPQ-37										V				
Abrams M-1										V				
Bradley M-2										V				
AH-64										V				
AH-66				J						V				
CH-60 A2C2S / Evac										V				
OH-58										V				
JSTARS GSM / CGS										V				S
MMS										V				

Note 1. JTIDS 2M terminal translation only
2. MEADS is not currently funded.

E-3






US Navy Data Communications Capability

Agency / Link	A	B	C	J	ATDL	Link 22	NATO	IBS	USMTF	VMF	PLRS	CEC	IJMS	OTG
CV-ACDS Model 4	A		C	J ₁		22 ₂		IBS	M			CEC		OTG
CV-ACDS Model 5	A		C	J		22 ₂		IBS	M			CEC		OTG
CG-Aegis Model 4	A		C	J ₁		22 ₂		IBS	M			CEC		OTG
CG-Aegis Model 5	A		C	J		22 ₂		IBS	M			CEC		OTG
DDG-ACDS Model 4	A		C	J		22 ₂		IBS	M			CEC		OTG
DDG-993	A		C	J		22 ₂			M					OTG
DD-963	A		C						M					OTG
DDG-Aegis	A		C	J		22 ₂			M					OTG
FFG	A								M					OTG
LHA / LHD	A		C	J ₂		22 ₂		IBS	M		P			OTG
LCC	A		C	J		22 ₂		IBS	M					OTG
SSN	A			J		22 ₂			M					
E2-C	A		C	J										
F-14D			C	J										
F/A-18			C	J ₂						V ₂				
EA-6B			C											
P-3C	A													
EP-3	A			J										
S-3 / ES-3	A		C											
JSF			C ₂	J ₂										
TSC/MOCC/MICFAC	A													

Note 1. Not all ships are TADIL J capable.
2. Planned capability.

E-4






NATO Data Communications Capability

Nation	Agency	A	B	C	Link 22	NATO	ATDL	J	IJMS	FORMETS	VMF	SADL	CEC
Belgium 	Army									F			
	Navy	A								F			
	Air Force												
	NADGE					NATO							
Canada 	Land Cmd												
	Maritime	A			22 ₁			J ₁		USMTF			
	Air Cmd	A						J ₁					
	NORAD	A	B	C				J ₁		USMTF			
Czech Republic 	Army												
	Air Force												
Denmark 	Army									F			
	Navy	A											
	Air Force												
	NADGE					NATO							
Germany 	Army		B										
	Navy	A			22 ₁			J					
	Air Force							J					
	GEADGE					NATO							

Note 1. Planned capability.

E-5






NATO Data Communications Capability

Nation	Agency	A	B	C	Link 22	NATO	ATDL	J	IJMS	FORMETS	VMF	SADL	CEC
Greece 	Army												
	Navy	A								F			
	Air Force												
	NADGE					NATO							
Hungary 	Army												
	Air Force												
Iceland 	Icelandic Defense Force												
	IADS	A	B			NATO	ATDL	J ₁					
Italy 	Army						ATDL						
	Navy	A			22 ₁			J ₁					
	Air Force	A ₂	B ₂	C ₂		NATO ₂	ATDL ₂	J ₂					
	NADGE					NATO		J ₁					
Luxembourg 	Army												
	NADGE					NATO		J ₁					

Note 1. Planned capability.
 2. CCTA (AN/TYQ-23(V)AMI)

E-6






NATO Data Communications Capability

Nation	Agency	A	B	C	Link 22	NATO	ATDL	J	IJMS	FORMETS	VMF	SADL	CEC
Netherlands 	Army									F			
	Navy	A						J ₁					
	Air Force												
	NADGE					NATO							
Norway 	Army									F			
	Navy	A											
	Air Force												
	NADGE					NATO							
Poland 	Army												
	Navy												
	Air Force												
	Air Defense												
Portugal 	Army												
	Navy	A											
	Air Force												
	POACCS					NATO							
Spain 	Army												
	Navy	A											
	Air Force							J ₁					
	SADA					NATO		J ₁					

Note 1. Planned capability.

E-7

NATO Data Communications Capability

Nation	Agency	A	B	C	Link 22	NATO	ATDL	J	IJMS	FORMETS	VMF	SADL	CEC
Turkey 	Army												
	Navy	A											
	Air Force												
	NADGE					NATO							
United Kingdom 	Air Force	A						J	I				
	Army									F			
	Navy	A			22 ₃			J	I				
	IUKADGE	A				NATO		J	I	F			
United States₁ 	Army	A	B				ATDL	J	I ₅	USMTF	V ₃	EP	
	Navy	A		C	22 ₃			J		USMTF	V ₃	P	CEC
	Marine Corps	A	B	C	22 ₃	NATO	ATDL	J		USMTF	V ₃	EP	CEC
	Air Force	A	B	C		NATO	ATDL	J	I	USMTF	V ₃	S	
France₂ 	Army									F	V ₃		
	Navy	A			22 ₃			J					
	Air Force	A		C ₄				J	I				
	STRID					NATO							
NATO 	AWACS	A		C ₄				J	I				

Notes 1. See pages E-1 thru E-4 for detailed implementation.






4. C2 Transmit only.

2. France is a NATO nation but not a participant in the NATO military alliance.

3. Planned Capability

E-8

Allied Data Communications Capability






Nation/Link	Agency	A	B	C	J	MBDL	ATDL	IJMS	OTG	Forms	VMF	SADL	CEC
Australia 	Army									ADFORM ₄	VMF ₁		
	Navy	A			J ₁					ADFORM ₄			
	Air Force									ADFORM ₄			
Egypt 	Army					MBDL	ATDL						
	Navy	Y ₂											
	Air Force	A											
	Air Defense					MBDL							
Finland 	Army												
	Navy												
	Air Force												
Israel 	Land					MBDL	ATDL						
	Navy	Reshet											
	Air Force	Reshet											
Japan 	Army		B			MBDL	ATDL						
	Navy	A			J ₁								
	Air Force	A			J _{1,3}								

Note 1. Planned capability.
2. Similar to TADIL A

3. AWACS
4. ADFORMS similar to USMTF

E-9






Allied Data Communications Capability

Nation/Link	Agency	A	B	C	J	MBDL	ATDL	IJMS	OTG	USMTF	VMF	SADL	CEC
Jordan 	Army					MBDL	ATDL						
	Air Force												
Korea 	Army		B			MBDL	ATDL						
	Navy	A											
	Air Force		B										
	Marine Corps												
Kuwait 	Army						ATDL						
	Navy	A											
	Air Force												
Malaysia 	Army												
	Navy	Y ₁											
	Air Force												
Qatar 	Army												
	Navy	Y ₁											
	Air Force												

Note 1. Similar to TADIL A

E-10






Allied Data Communications Capability

Nation/Link	Agency	A	B	C	J	MBDL	ATDL	IJMS	OTHG	Forms	VMF	SADL	CEC
	Army									ADFORM ₄			
	Navy	A							OTG	ADFORM ₄			
	Air Force									ADFORM ₄			
	Army												
	Navy	Y ₂											
	Air Force												
	Army												
	Navy	Y ₂											
	Air Force												
	Army						ATDL						
	Navy	W ₂											
	Air Force	A											
	Air Defense	A	B				ATDL						
	Army												
	Navy	A			J _{1,3}								
	Air Force												

Note 1. Planned capability. 2. Similar to TADIL A 3. P3 & Corvette 4. Similar to USMTF

E-11

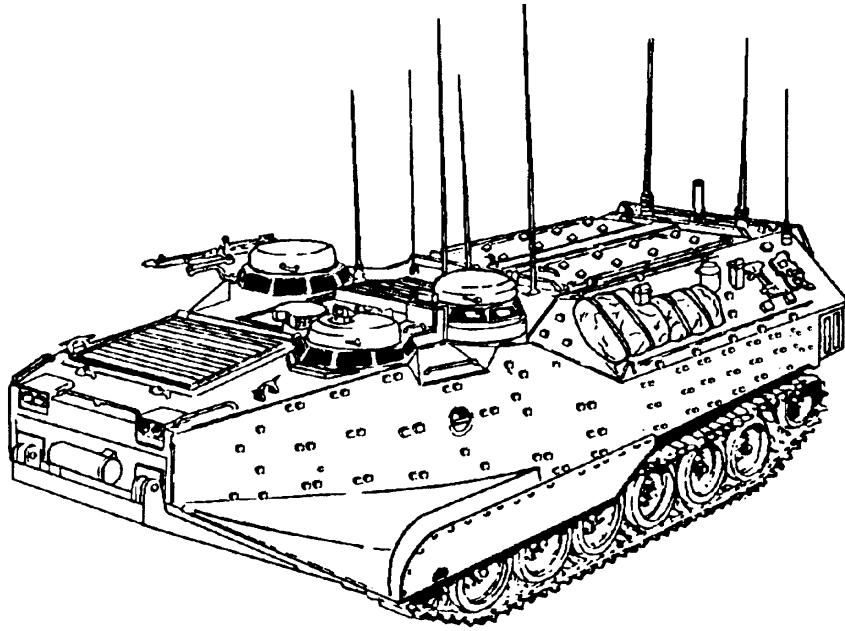
Allied Data Communications Capability

Nation/Link	Agency	A	B	C	J	MBDL	ATDL	IJMS	OTG	USMTF	VMF	SADL	CEC
	Army												
	Air Force												
	Army					MBDL	ATDL						
	Navy	W ₃											
	Air Force												
	Army					MBDL	ATDL				VMF ₁		
	Navy	A											
	Air Force	A ₄	B ₄										
	Air Force												
	Army					MBDL	ATDL						
	Navy	A											
	Army	A	B		J	MBDL	ATDL			USMTF	VMF ₁	S/EP	
	Navy	A		C	J				OTG	USMTF	VMF ₁	P	CEC
	Marine Corps	A	B	C	J	MBDL	ATDL		OTG	USMTF	VMF ₁	EP	CEC ₁
	Air Force	A	B	C	J		ATDL	IJMS	OTG	USMTF	VMF ₁	S	

Note 1. Planned Capability 2. See pages E-1 thru E-4 for detailed implementation. 3. Similar to TADIL A 4. AOC/SSOC

E-12

APPENDIX F



ACRONYMS

Acronyms

ABCCC	Airborne Battlefield Command and Control Center
ABL	Airborne Laser (USAF)
ABT	Air Breathing Threat
ACASS	Advanced Close Air Support System
ACDS	Advanced Combat Direction System (USN)
ACE	Aviation Combat Element (USMC)
ACLS	Automated Carrier Landing System (USN, USMC)
ACP	Allied Communications Publication
ADatP	Allied Data Publication (NATO)
ADCP	Air Defense Communication Platform AN/MSQ-124
ADFORM	Administrative Form (Australia, New Zealand)
ADS	Airspace Deconfliction System (CTAPS)
ADSI	Air Defense Systems Integrator AN/TSQ-214
ADTOC	Air Defense Tactical Operations Center (USA)
AEGIS	Airborne Early Warning Ground Integration Segment
AFAPD	Air Force Application Program Development
AFATDS	Advanced Field Artillery Tactical Data System
AIC	Air Intercept Control
AITG	Airborne Integrated Terminal Group
AJ	Anti Jam
AM	Amplitude Modulation
AME	Amplitude Modulation Equivalent
AMRAAM	Advanced Medium Range Air to Air Missile AIM-120
ANES	Alternate Network Entry Slots
AOC	Air Operations Center (USAF)
AOI	Area of Interest or Area of Influence
AOR	Area of Responsibility
APS	Air Planning System (CTAPS)
AS	Anti-Spoofing
ASAS	All Source Analysis System
ASCII	American Standard Code Information Interchange
ASIT	Adaptable Surface Interface Terminal (USA, USAF)
ASOC	Air Support Operations Center (USAF)
ASPARCS	Air Surveillance and Precision Approach Radar Control System
ATACC	Alternate Tactical Air Command Center
ATARS	Advanced Tactical Airborne Reconnaissance System
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon Mode S
ATDL-1	Army Tactical Data Link 1
ATDS	Airborne Tactical Data System (USN)
ATHS	Automatic Target Handover System
ATI	Artillery Target Intelligence
ATO	Air Tasking Order
AUTODIN	Automatic Digital Network
AW	All Weather

Acronyms

AWACS	Airborne Warning and Control System (USAF)
BCD	Battlefield Coordination Detachment (USA)
BCS	Battery Computer System (USA)
BMDO	Ballistic Missile Defense Office
BUU	Basic User Unit AN/PSQ-4 (PLRS)
CA	Contention Access
CAC2S	Common Air Command and Control System (USMC)
CAFMS	Computer Assisted Force Management System
CC-OS	COMINT Collection Outstations (TPCS)
CE	Command Element
CEC	Cooperative Engagement Capability (USN/USMC)
CG	Ship class - Cruiser
CGS	Common Ground Station AN/TSQ-179
CHC	Current Hop Count
CIBS-M	Common Integrated Broadcast Service-Module
CIC	Combat Information Center (USN)
CINC	Commander In Chief
CIS	Combat Intelligence System (CTAPS)
CJCSM	Chairman Joint Chiefs of Staff Manual
CJCSI	Chairman Joint Chiefs of Staff Instruction
CLAWS	Complementary Low Altitude Weapons System
CLEW	Conventional Link 11 Waveform
CMP	Common Message Processor
CMS	Common Mapping System (CTAPS)
COC	Combat Operations Center (USMC)
COE	Common Operating Environment
COI	Community of Interest
COP	Common Operational Picture
CSSE	Combat Service Support element
CTAPS	Contingency Automated Planning System AN/TYY-1
CTP	Common Tactical Picture
COMINT	Communications Intelligence
CPD	Cryptographic Period Designator
CRC	Control and Reporting Center (USAF)
CRE	Control and Reporting Element (USAF)
CS	Communications Subsystem (TPCS)
CTAPS	Contingency Theater Automated Planning System
CTT	Commanders Tactical Terminal (AN/USC-55)
C2P	Command and Control Processor (USN)
C2PC	Command and Control Personal Computer (USMC)
C4I	Command Control Communications Computers Intelligence
CV	Ship class – Aircraft carrier
CVLL	Cryptographic Variable Logic Label
CVM	Cryptographic Variable Mode
CWAR	Continuous Wave Acquisition Radar AN/MPQ-62

Acronyms

DA	Dedicated Access
DACT	Data Automated Communications Terminal
DAMA	Demand Assigned Multiple Access
DASC	Direct Air Support Center (USMC)
DCS	Digital Communication System
DCS	Digital Communications System
DCT	Digital Communications Terminal AN/PSC-2
DDG	Ship class – Destroyer
DDS	Data Distribution System (CEC)
DEQPSK	Differential Encoded Quadrature Phase Shift Keying
DF	Direction Finding
DGPS	Differential Global Positioning System
DISA	Defense Information Services Agency
DII	Defense Information Infrastructure
DLR	Data Link Processor (NILE)
DLRP	Data Link Reference Point
DMA	Defense Mapping Agency
DME	Distance Measuring Equipment
DoD	Department of Defense
DRASH	Deployable Rapid Assembly Shelter
DSCS	Defense Satellite Communications System
DSN	Digital Subscriber Network
DSP	Defense Support Program
DSSCS	Defense Special Security Communications System
DSVT	Digital Secure Voice Telephone
DVT/DA	Digital Voice Telephone/Data Adapter
EA	Electronic Attack
ES	Electronic Support
ECCM	Electronic Counter Counter Measures
ECM	Electronic Counter Measures
EDC	Error Detection Correction
EHF	Extremely High Frequency
EPLRS	Enhanced Position Location Reporting System
EPUU	Enhanced PLRS User Unit AN/VSQ-2C
ESM	Electronic Support Measures
ETRAC	Enhanced Tactical Radar Correlator
ELINT	Electronic Intelligence
EVAC	Evacuation System (GCCS)
EW/C	Early Warning/Control (USMC)
FAAD	Forward Area Air Defense (USA)
FAADC2I	Forward Area Air Defense Command Control Intelligence (USA)
FAC	Forward Air Controller (USMC/USAF)
FAC (A)	Forward Air Controller (Airborne)
FDC	Fire Direction Center (USMC/USA)

Acronyms

FED	Forward Entry Device (USA)
FFCC	Force Fire Coordination Center (USMC)
FFG	Ship class - Frigate
FJU	Forwarding JTIDS Unit
FLTSATCOM	Fleet Satellite Communications
FLIR	Forward Looking Infra-Red
FM	Frequency Modulation
FO	Forward Observer (USMC/USA)
FOC	Full Operational Capability
FOS	Forward Observer System (USA)
FRAS	Fuel Resources Analysis System (GCCS)
FRU	Forwarding Reporting Unit (TADIL)
FSCC	Fire Support Coordination Center (USMC/USA)
FSK	Frequency Shift Keying
FSSG	Force Service Support Group (USMC)
FTI	Fixed Target Indicator (JSTARS)
FWF	Fixed Word Format
GBDL	Ground Based Data Link - (USMC)
GBS	Global Broadcast Service
GCA	Ground Controlled Approach
GCCS	Global Command and Control System
GCE	Ground Combat Element
GCI	Ground Controlled Intercept
GDOP	Geodetic Dilution of Position
GEADGE	German Air Defense Ground Environment
GENSER	General Service
GEOREF	Geographic Reference
GMF	Ground Mobile Force
GPS	Global Positioning System
GRIS	Global Reconnaissance Information System (GCCS)
GSM	Global System for Ground Mobile Force
GSORTS	Global Status of Resources & Training System
HARM	High Speed Anti-Radiation Missile
HF	High Frequency
HMH	Heavy Helicopter Squadron
HMM	Medium Helicopter Squadron
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HMLA	Light/Attack Helicopter Squadron
HQ	Headquarters
HST	Helicopter Support Team
HUD	Heads Up Display
IADS	Icelandic Air Defense System
IAS	Intelligence Analysis System (USMC)
IBDL	Intra-Battery Data Link
IBS	Integrated Broadcast Service

Acronyms

ICC	Information Coordination Center-Patriot Battalion (USA)
ICD	Interface Control Document
IDH	Interface Design Handbook (JIEO)
ICM	Intelligence Correlation Module (CTAPS)
IEWCS	Intelligence & Electronic Warfare Common Sensor
IFR	Instrument Flight Rules
IFSAS	Interim Fire Support Automated System
IFF	Identification Friend or Foe
IJMS	Interim JTIDS Message Specification
INCG	Interim Network Configuration Generator
INE	Initial Net Entry
IOC	Initial Operational Capability
IOW	IAS Operator Workstation
IPF	Interference Protection Feature
IR	Infra Red
IRIS	Image Recognition Integrated System
ISO	International Standards Organization
JANAP	Joint Army, Navy Air Force Publication
JCS	Joint Chiefs of Staff
JCTN	Joint Composite Tracking Network
JDAM	Joint Direct Attack Munitions
JDN	Joint Data Network
JDISS	Joint Deployable Intelligence Support System
JINTACCS	Joint Tactical Command and Control System
JIEO	Joint Information & Engineering Organization
JITC	Joint Interoperability Test Command
JMAP	Joint Message Analysis & Processing (CTAPS)
JMCIS	Joint Maritime Command Information System
JMPP	Joint Message Processing & Parsing (CTAPS)
JMTOP	Joint Multi-TADIL Operating Procedures
JNDA	Joint Network Design Aid
JNL	Joint Network Library
JOPES	Joint Operation Planning and Execution System
JOTS	Joint Operational Tactical System
JPN	Joint Planning Network
JSF	Joint Strike Fighter (X-32/X-35)
JSIPS	Joint Service Imagery Processing System
JSOW	Joint Stand Off Weapon
JSTARS	Joint Surveillance Target Attack Radar System E-8 (USAF/USA)
JTADS	Joint Tactical Air Defense System (USA)
JTAGS	Joint Tactical Ground Station (USA)
JTAMDO	Joint Theater Air & Missile Defense Organization
JTRS	Joint Tactical Radio System
JTT	Joint Tactical Terminal
JTIDS	Joint Tactical Information Distribution System

Acronyms

JNDA	Joint Network Design Aid
JNL	JTIDS Network Library
JTIDS	Joint Tactical Information Distribution System
JU	JTIDS Unit
JWICS	Joint World Wide Intelligence Communications System
KMP	Key Management Plan
LAAD	Low Altitude Air Defense (USMC)
LAN	Local Area Network
LAPWS	Link All Purpose Work Station
LAV-AD	Light Armored Vehicle-Air Defense
LCC	Ship class – Amphibious Command and Control
LHA	Ship class – Amphibious Assault
LHD	Ship class – Amphibious Assault Dock
LOS	Line of Sight
LPE	Low Probability Exploitation
LPI	Low Probability Intercept
LSD	Ship class – Landing Ship Dock
LST	Ship class – Landing Ship Tank
LVT	Low Volume Terminal (JTIDS)
MACCS	Marine Air Command and Control System
MACG	Marine Air Control Group
MACS	Marine Air Control Squadron
MAG	Marine Air Group
MAGR	Miniature Airborne GPS Receiver
MAGTF	Marine Air Ground Task Force
MAGIS	Marine Air Ground Intelligence System
MALS	Marine Aviation Logistic Squadron
MASS	Marine Air Support Squadron
MATCALS	Marine Air Traffic Control and Landing System
MATCD	Marine Air Traffic Control Detachment
MATT	Multi-mission Advanced Tactical Terminal
MATT/IDM	Multi-Mission Advanced Tactical Terminal/Improved Data Modem (EA6B)
MBC	Mortar Ballistic Computer
MBDL	Missile Battery Data Link
MCSSC2S	Marine Corps Service Support Command Control System
MCTSSA	Marine Corps Tactical Systems Support Activity
MCS	Maneuver Control System (USA)
MCE	Modular Control Element AN/TYQ-23 (USAF)
MDSS	MAGTF Deployment Support System
MEADS	Medium Expeditionary Air Defense System (USA)
MEB	Marine Expeditionary Brigade
MEC-DL	Mission Equipment Control-Data Link (MEWSS)
MEF	Marine Expeditionary Force
MEP	Mobile Electric Power
MERWS	Modular Extendable Ridged Walled Shelter

Acronyms

MEU	Marine Expeditionary Unit
MEWSS	Mobile Electronic Warfare Support System
MFL	Multi-Frequency Link
MGRS	Military Grid Reference System
MIDB	Modernized Integrated Database (IAS)
MIDS	Multi-Functional Information Distribution System
MILSTAR	Military Satellite Communications System
MIPS	Marine Integrated Personnel System
MIST	Modular Interoperable Surface Terminal
MLRS	Multiple Launch Rocket System (USA)
MLSOP	Multi-Link Standard Operating Procedures (NATO)
MMS	Meteorological Measurement System
MOI	Message of Interest
MRC	Mobile Radio Communications
MSBL	MAGTF Software Baseline
MSCS	Multiple Source Correlation System AN/TYQ-101
MSEC	Message Security
MSI	Multi-Sensor Integration
MTACS	Marine Tactical Air Command Squadron
MTACCS	Marine Tactical Command Control System
MTI	Moving Target Indicator
MTM	IBS
MTS	Marine Tactical System
M3P	See JTACS (US Army)
MWCS	Marine Wing Communications Squadron
MWSG	Marine Wing Support Group
MWSS	Marine Wing Support Squadron
NADGE	NATO Air Defense Ground Environment
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training & Operating Procedures Standardization
NAVSTAR	Navigation Satellite Timing and Ranging
NCA	National Command Authority
NCE	NILE Communications Equipment
NCS	Net Control Station
NDA	Network Design Aid
NEA	Net Entry Aid
NECT	Network Entry Control Terminals
NGS	Naval Gunfire Spotter (USMC/USN)
NICP	Network Interface Computer Program
NILE	NATO Improved Link 11 Equipment
NIPS	Naval Intelligence Processing System
NIPRNet	Unclassified Sensitive Internet Protocol Routing Net (USN)
NPG	Network Participating Group
NRTD	Near Real Time Dissemination System

Acronyms

NTIA	National Telecommunications and Information Administration
NTR	Net Time Reference
NU	NILE Unit
OHC	Original Hop Count
OPFAC	Operational Facility
OS	Operational Specification
OTAR	Over The Air Rekeying
OTCIXS	Officer In Tactical Command Information Exchange System
OTG	Over the Horizon Targeting Gold
OTH-T	Over the Horizon Targeting
PCM	Pulse Code Modulation
PCP	Platoon Command Post (USA)
PG	Participating Group
PLGR	Precision Lightweight GPS Receiver AN/PSN-11
PLRS	Position Location Reporting System AN/TSQ-129A (USMC/USA)
PPDL	Point to Point Data Link
PPLI	Precise Position Location and Identification
PQ	Position Quality
PR	Position Reference
PROC	Puerto Rican Operations Center
P2DP	Packed Two Double Pulse
P2SP	Packed Two Single Pulse
P4SP	Packed Four Single Pulse
PU	Participating Unit (TADIL)
PVM	Partition Variable Mode
RADIC	Rapidly Deployable Integrated Command and Control
RADIL	Region Operations Control Center AWACS Digital Information
RAMDASC	Replacement Air Mobile Direct Air Support Center (USMC)
RAOC	Regional Air Operations Center (USAF)
RAAP	Rapid Application of Air Power (CTAPS)
RELNAV	Relative Navigation
REMBASS	Remotely Monitored Battlefield Sensor System
RF	Radio Frequency
RREP	Radio Reconnaissance Equipment Program (USMC)
RRN	Recurrence Rate
RRR	Repromulgation Recurrence Rate
RRT	Radio Reconnaissance Team
RSMS	Remote Sensor Management System (TRSS)
RTT	Round Trip Timing
RTU	Remote Terminal Unit (LAAD)
RU	Reporting Unit (TADIL)
SA	Selective Availability (GPS)
SAAWC	Sector Anti-Air Warfare Coordinator
SAAWF	Sector Anti-Air Warfare Facility (USMC)
SACC	Supporting Arms Coordination Center (USMC/USN)

Acronyms

SADL	Situational Awareness Data Link (USAF/USA)
SAOC	Sector Air Operations Center (USAF)
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communications
SBIRS	Space Based Infrared System
SCDL	Surveillance and Control Data Link (USA, USMC, USAF)
SCI	Special Compartmented Information
SDU	Secure Data Unit
SDS	Shared Data Server
SHF	Super High Frequency
SHORAD	Short Range Air Defense
SIAP	Single Integrated Air Picture
SICP	Subscriber Interface Computer Program
SICPS	Shelterized Integrated Command Post Shelter
SIGINT	Signals Intelligence
SINCGARS	Single Channel Ground & Airborne Radio System
SIPRNet	Secret Internet Protocol Routing Net (USN)
SIS	Special Information System (NSA)
SLEW	Single Tone Link 11 Waveform
SMMS	Sensor Mobile Monitor System (TRSS)
SOC	Sector Operations Center (USAF)
SPADA	System For Point Air Defense (Italy)
SPI	Special Processing Indicator
SRIG	Surveillance, Reconnaissance, Intelligence Group (USMC)
SSB	Single Side Band (HF)
SSN	Ship class – Submarine
SSSB	Ship-Shore-Ship Buffer (USN)
STANAG	Standard Agreement (NATO)
STDP	Standard Double Pulse
STRIDA	Systeme de Traitement et Representation des Informations de Defense Aerienne (France)
STN	System Track Number
STOL	Short Take Off and Landing
SU	Supporting Unit (TADIL)
TACAN	Tactical Air Navigation
TACC	Tactical Air Command Center (USMC)
TACC	Tactical Air Control Center (USN)
TACFIRE	Tactical Fire Direction System
TACP	Tactical Air Control Party (USMC, USAF)
TAOC	Tactical Air Operations Center (USMC)
TADC	Tactical Air Direction Center (USMC/USN)
TADIL	Tactical Digital Information Link
TADIXS-B	Tactical Digital Information Exchange System B
TAMPS	Tactical Air Mission Planning System
TAOM	Tactical Air Operations Module AN/TYQ-23 (USMC)

Acronyms

TARGET	Theater Analysis & Replanning Graphic Execution Toolkit
TBD	To Be Determined
TBM	Theater Ballistic Missile
TBMCS	Theater Battle Management Core System
TCAC	Technical Control Analysis Center (USMC)
TCIM	Tactical Communications Interface Modem (USMC)
TCO	Tactical Combat Operations (C2PC)
TCP/IP	Transmission Control Protocol/Internet Protocol
TDAR	Tactical Defense Alert Radar AN/UPS-3 (USMC)
TDDS	TRAP Data Dissemination System
TDMA	Time Division Multiple Access
TDP	Tactical Data Processor (OTG)
TDS	Tactical Data System
TERPES	Tactical Electronic Reconnaissance Processing and Evaluation System
THAAD	Theater High Altitude Air Defense (USA)
TIBS	Tactical Information Broadcast Service (USAF)
TIDP	Technical Interface Design Plan
TIDS	Technical Interface Design Standard
TINS	Thermal Imaging Navigation System
TISD	Tactical Integrated Situation Display (USAF)
TLDHS	Target Location Designation Handoff System
TMD	Theater Missile Defense
TMD TOC	Theater Missile Defense Tactical Operations Center (USA)
TOA	Time of Arrival
TOC	Tactical Operations Center (USA)
TPCS	Team Portable Collection System
TQ	Time Quality
TRAP	Tactical Receive Equipment & Related Applications
TRE	Tactical Receive Equipment
TRIXS	Tactical Reconnaissance Intelligence Exchange Service
TRSS	Tactical Remote Sensor System (USMC)
TSB	Time Slot Block
TSDF	Time Slot Duty Factor
TSEC	Transmission Security
TSR	Time Slot Reallocation
UAV	Unmanned Aerial Vehicle
UFO	UHF Follow On (Satellite)
UHF	Ultra High Frequency
UPS	Universal Polar Sterographic
USMTF	United States Message Text Format
UTM	Universal Transverse Mercator
U2 DCGS	U2 Distributed Common Ground Station (USAF)
USSID	United States Signals Intelligence Directive
VFR	Visual Flight Rules

Acronyms

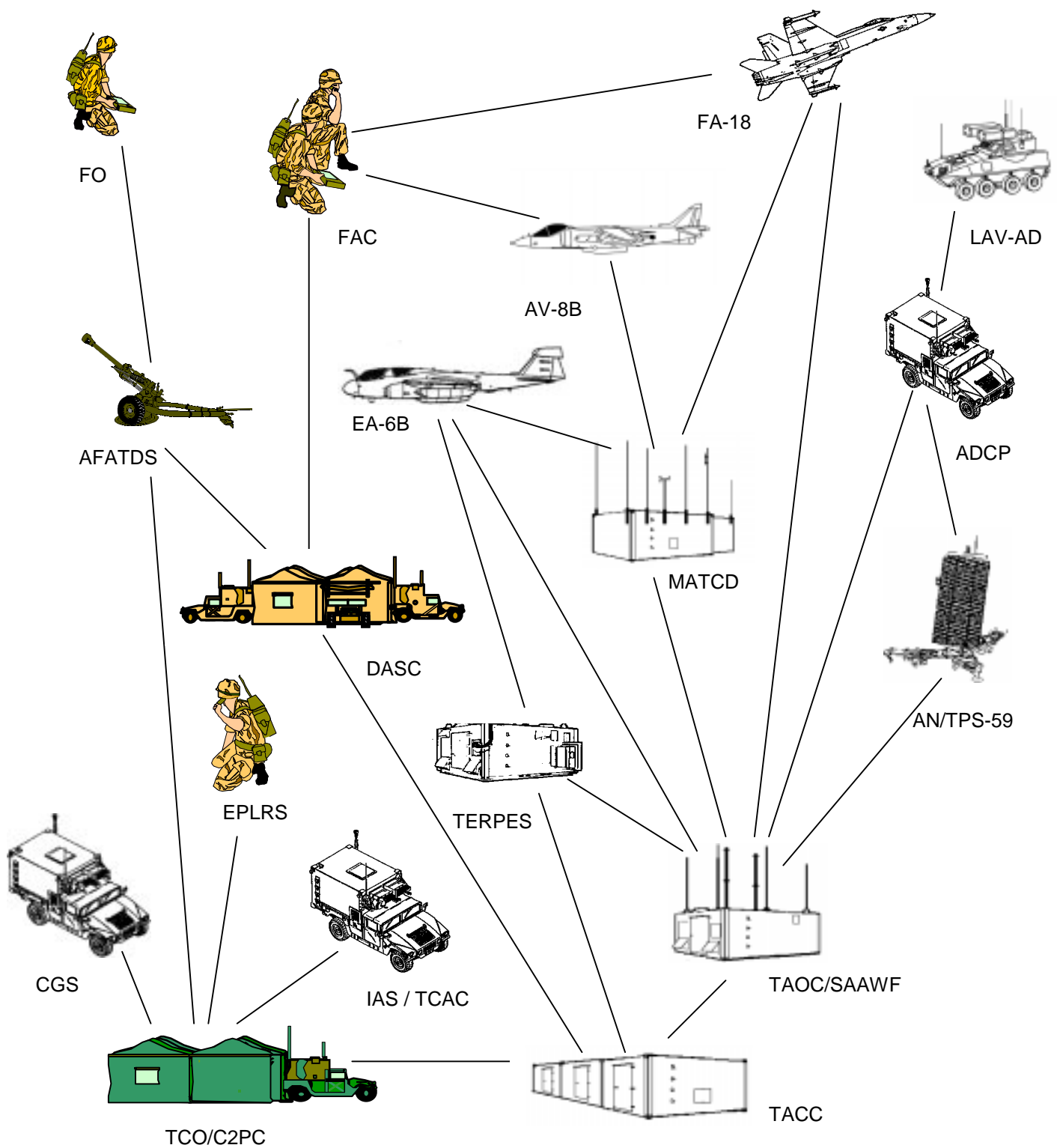
VHF	Very High Frequency
VMA	Marine Attack Squadron
VME	Virtual Memory Extension
VMAQ	Marine Attack Electronic Warfare Squadron
VMF	Variable Message Format
VMFA	Marine Fighter Attack Squadron
VMGR	Marine Utility Refueling Squadron
VTOL	Vertical Take Off and Landing
VWF	Variable Word Format
WAN	Wide Area Network
WAS	Wide Area Surveillance
WGS	World Geodetic System
WOC	Wing Operations Center (USAF)

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MARINE CORPS DATA EXCHANGE



Data exchange employs TADIL A, B, C, J, ATDL-1, NATO Link 1, SCDL, USMTF, VMF and GBDL message formats.



